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## Rail-Road News.

### Broad Gauge on the Far West Railroad.

Mr. James Kirkwood, engineer, of the Pacific Railroad, has come out in an able report to Mr. Allen, the President, in favor of the broad gauge on railroads west of the Mississippi. He states that the narrow gauge, which was first adopted in England, was not the result of experience as best suited to locomotive power, but was in a great measure accidental. He states, justly, that the fewer trains on a road the greater the safety and economy; hence, for heavy freight, powerful engines are the best; the exceptions to this rule are for passenger trains in a densely peopled country; but in a thinly peopled country the passenger business, to be done with profit to the company, must be done by large trains running once or twice per day both ways. The advantages of the wide over the narrow gauge are clearly set forth, and as the Mississippi cuts off all communication with the East, and West engines and carriages, no objection to the wide gauge, for non-intercommunication, can be urged. If all the railroads in the East were to be built over again, the broad gauge, we suppose, would be universally adopted. It would be well, then, for the States on the west of the Mississippi, to take Mr. Kirkwood's advice, and commence with the broad gauge of five feet six inches.

### Hudson River Railroad.

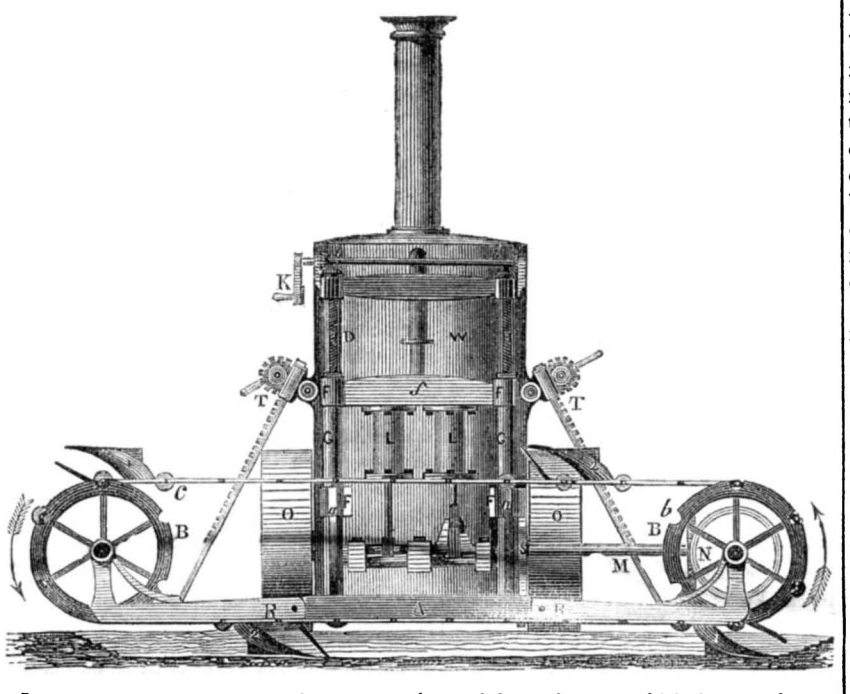
Before the first of October, it is announced that this road will be in operation to Albany. Geo. B. Butler, Esq., Secretary and legal Agent of the company, has resigned his position and he becomes a partner and assistant editor of the N. Y. Journal of Commerce. Mr. James Boorman, of New York, President of the Company resigns his office on the completion of the road, and Mr. Wm. C. Young, the present Chief Engineer of the road is to take his place. When this road is completed we shall be able to go to Albany in five hours, at most.

### Pittsburg and Erie Railroad.

The Mercer Luminary learns that the entire line of the Pittsburg and Erie Railroad, from the town of Erie to the junction with the Ohio and Pennsylvania Railroad at Enon Valley, was contracted for at Erie, on the 13th inst There was quite an animated competition among bidders, and it is said the work has fallen into competent hands.

Twenty miles of the Milwaukie and Mississippi Railroad, west from Milwaukie, have been completed, and are now in operation, and in about three months time about eighteen miles more will be finished. The length of this road will be about 200 miles, and the cost with a heavy T rail, so far as constructed, is only about $12,000 per mile. The authorized capital of the company is $3,000,000, of which nearly $1,000,000 has been subscribed by the people of Wisconsin.

## STEAM PLOW.---Fig. 1.



In our country no attempts, so far as we are aware, have yet been made to plow by steam, nor has the time yet arrived for its economical use; in some localities, however, the time will yet arrive, when serious thoughts will be turned to its employment, as is now the case in Britain.

The accompanying engravings represent a steam plow, invented a short time ago by Messrs George Calloway, and Robert A. Purkis, of Putney, England, and which has been somewhat highly spoken of.

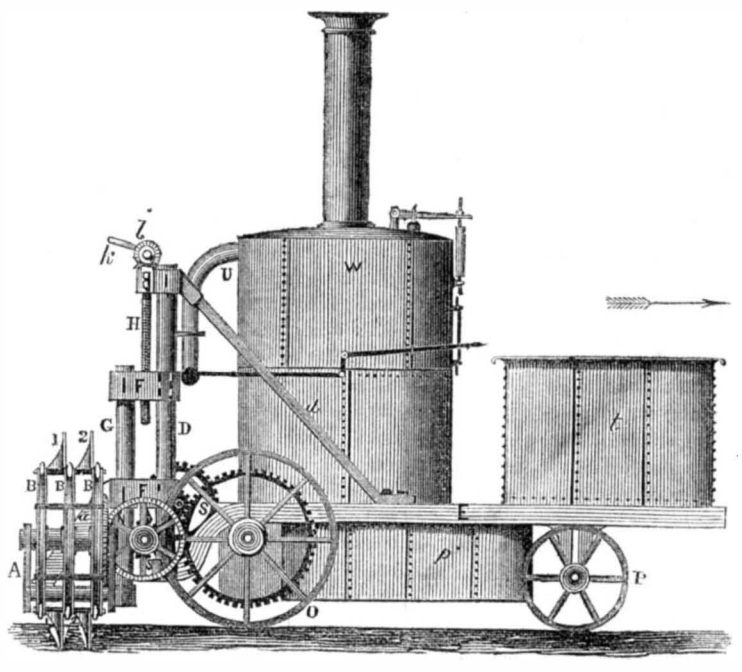
The mechanism of this steam plow is divided into two distinct parts, 1st, the plowing, 2nd, the locomotive part: to avoid confusion each part must be explained separate:—

The plowing part mainly consists of an endless chain, supported and driven by two sets of chain wheels, to which chain are fastened the plows, and consequently advance with it, which operation is accomplished in the following manner:—

Fig. 1 represents an end elevation, and fig. 2 a side elevation; the same letters denote corresponding parts in either figure.

A is a wrought iron frame, eighteen feet long, supporting on each end an axle, on which are keyed three cast-iron chain wheels, B, round which is passed the endless chain, C. This chain is eighteen inches broad, composed of two sets, nine inches wide, seen at B B B, fig. 2; on the outside of this chain are fixed four plows, 1 1, 2 2, in such a manner that 1 1 revolving on the same set, 2 2, B, fig. 2, does so in the same manner. D D, are two hollow wrought iron stanchions, firmly keyed and

## Figure 2.



stayed to the framework of the locomotive at E *d*. The entire length of these stanchions is turned perfectly true, on which slide the four guides, F, into which are firmly keyed the two hollow tubes, G. The two upper guides, F, are cast in one piece with a cross head, *f*, and the lower guides, F, with the diagonal stays, *a*, *a*. These combinations of parts are firmly fastened to the frame, A.

H H are two screws working into the upper guides, F F. On the upper part of thes screws are fixed two bevelled wheels, *l*, which receive rotary motion from the handle, *k*, which will cause the framework, A, with the chain C, and plows to rise and fall at the will of the attendant.

L L, fig. 1, are a pair of oscillating steam engines fitted to the crosshead, *f*, and moving with the parts just described. M is a shaft in connection with the crank of the engines, driving a pair of bevelled wheels, N, one of which is fastened to the chain wheel, B, *b*, by which means a rotary motion is given to the endless chain, C, causing the plows to advance in the direction of the arrow. At the bottom of the wrought-iron framework, A, is formed a channel or guide for the antifriction rollers, fixed to the chain to run in, causing the plows to travel in the path assigned for them. It will be seen, as far as described, that a double row of furrows can be cut twenty feet long at any required depth within range of the machine, which is eighteen inches. To complete the process of plowing brings us to the second, or locomotive part, for which purpose the machine is made to advance progressively at right angles away from the furrows already cut, and is accomplished in the following manner:—

O O are two cast iron wheels, eighteen inches broad, in conjunction with two others, P, the axles of which support and carry the whole machine. O O are the two driving wheels, driven by the means of a combination of wheel work, S S, receiving primitive motion from the engine direct. This combination of wheels is so adjusted that, for one revolution of the chain, which plows up four furrows twenty feet long each, the machine will have advanced progressively thirty-six inches.—This operation being continually repeated, the engine will leave before it a surface of twenty feet broad, cut to any required depth, and executed with mathematical precision.

The lines or furrows thus cut will be slightly oblique, but may be made at right angles by placing the frame, A, at the required angle of the framework of the carriage, E.

The steering apparatus is of the ordinary construction as applied to all locomotives used on the common roadway. It will be seen that if the frame, A, was in one piece it would be inconvenient to move from place to place. This objection is removed by the following method:—The framework is divided into three pieces, and connected by means of the joints, R R, which enables the partly connected with the chain wheels B B, to be turned up and closed together by means of racks and pinions, T T. U is the steam-pipe from the boiler, W, fitted with moveable sockets to compensate for the rise and fall of the engine with which it is connected; *t* is is the coal box, and *p*, the water-tank; the arrow indicates the motion of the locomotive.

In England it is estimated that the cost for steam power, is less by one half than that for horses, in our country even near the city of New York, the expenses would just be reversed. These things however, are of interest to our great agricultural community. The locations where steam plowing will turn out to be the most advantageous, will be in the Southern States, in favored level locations, where fuel is very cheap. The iron horse is not affected with heat, and his nerves and sinews do not require relaxation like those of the horse or mule.

### Our Illustrations.

No less than six new inventions are illustrated in our columns this week, nine different figures are employed in the illustrations, these with the diagrams representing the action of water make up fourteen different figures. From week to week, no mechanical periodical in the world presents so many illustrated inventions to the public as the Scientific American, and no man can keep up with the improvements of the age and be without it.

### Iron-Horse Race.

The Lowell Courier announces a race between locomotives, to take place at the approaching Fair in Lowell. The race-course is to be a section of the Boston and Lowell road.

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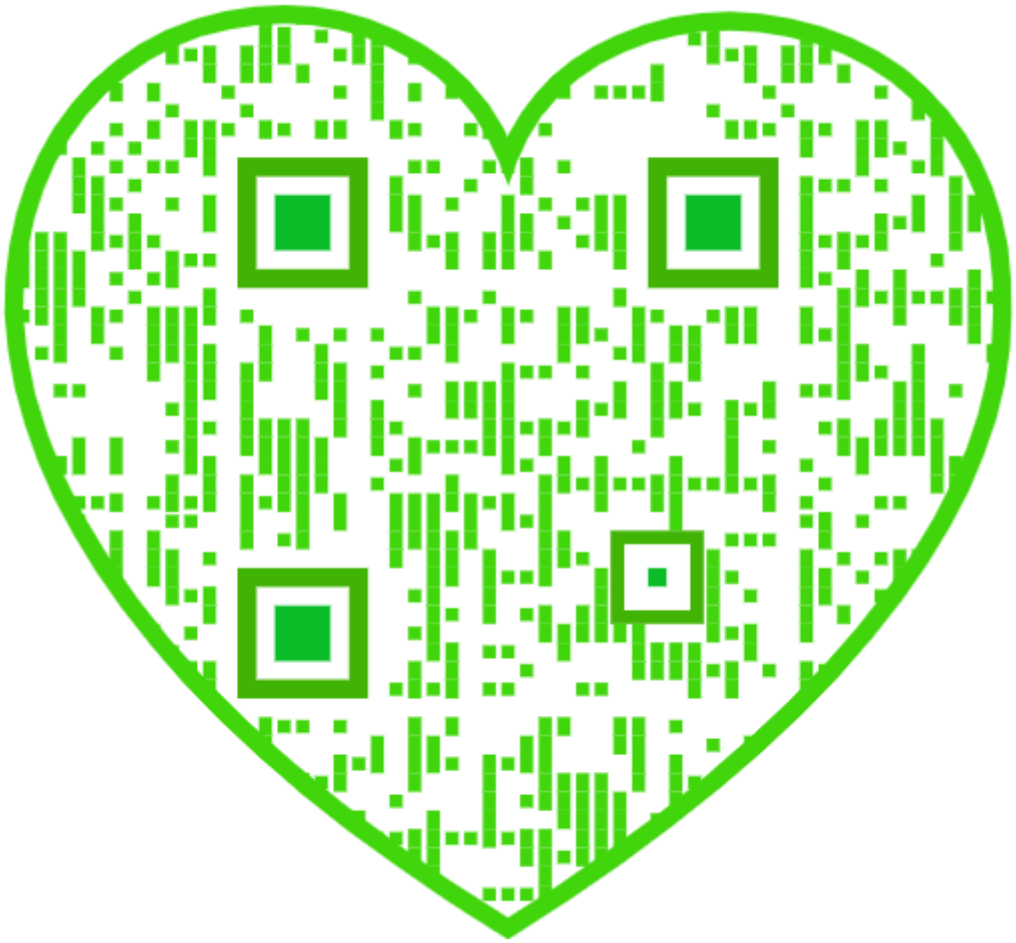

# Miscellaneous.

Special Correspondence of the Scientific American.

### Life Boats.

LONDON, Aug. 12, 1851.

Among the numerous classes of articles, the life boat, to the people of America and England, is one of the most important. It stands high above either the organ or piano in point of true usefulness, although not in point of general interest; the latter feeling however, is quite natural, and no one can find fault with it.

"The requisites of a life-boat are—that it should be sufficiently strong to bear the shocks of breakers or of a rocky shore; that it should be light, so as to be readily launched; that its buoyancy should be independent of the air space accessible to the waves; that it should be so constructed as not to capsize; and be easily manageable withal."

Quite a number of life boats are exhibited, but the American one of Francis in my opinion surpasses every one made in this country. The favorite plan of the builders of the boats exhibited, is to give them perfect buoyancy by filling up the space at the head and at the stern of the boats either with enclosed air or with cork, and buoyancy is given to the sides in the same manner by the air being enclosed either in one continuous compartment, divided into partitions, or in separate cases. The superior lightness of air renders it more efficient as a buoyant agent than cork, but it is liable to the risk of escaping.

Cork is 4 times lighter than water, air is 850 times. One boat by a Mr. Clarkson, of London has cork planking and is a partial application of Mr. Annesley's principle of ship building. [This system was adopted in America, and tried on government vessels. A steamboat on Seneca Lake was also built on this principle, but we do not know of any vessel now in use in this country built on this principle, it has some merits however, which have been overlooked.]

The first layer of cork is attached to light framework, it is then covered with canvass and marine glue, on which other layers of cork are placed transversely, until the desired thickness and buoyancy are attained.

Several boats appear to be built so as to be easily capsized by having the air vessel under the seats—too near the centre of gravity, and some are too narrow. Great breadth affords increased security, especially when, as may be observed in several instances, a projecting thickness of cork is placed along both sides above the level of the seats. There is the model of an iron bottomless boat, enclosing air sufficient to give it ample buoyancy, is well adapted to go through the surf without upsetting, but cork is generally supposed to be a better material than iron. One of the most remarkable models exhibited is that of a collapsible life-boat, which is covered with felt, coated with India rubber. This boat will fold up so as to occupy little space on board ship, and when opened for service, the different compartments are filled with air and kept water-tight. It is well adapted to be kept in ships for the preservation of the passengers and crews in case of accident at sea; but it does not seem so well fitted to encounter breakers on shore.

Several of the models exhibited are constructed on the twin principle, two boats being fixed together by intervening planks. This form has the advantage of greater steadiness, as it would be almost imposible to capsize such a boat, but it has the inconvenience of weight, and would be difficult to manage.

Respecting one of the models exhibited, the inventor boasts that the boat would float equally well bottom upwards; a forlorn consideration, I suppose to those whose evil fortune might happen to be staked on its trustworthiness, especially when the bottom was up, and the bodies of the wrecked below.

[Twin life-boats are constructed upon a most erroneous principle. They do not boat so well as a single boat, they are liable to capsize, and have a greater preference for floating bottom upwards than downwards. To our knowledge, a twin life-boat highly recommended by some nautical men, was tried on the East River, in this city, and made a most beautiful somerset a short time after it was launched into the briny deep.]

One boat here is peculiarly constructed. A number of water-tight cylinders are placed inside a boat, each cylinder being adapted to hold a man. The interstices between the cylinders are filled with cork, and a deck, corresponding with the cylinders is fixed on the top. The boat thus forms a mass of cork, with holes in it, and with an external protecting planking of boards. No more persons could get on to such boats than there are holes to contain them; yet they may be made large enough to hold forty-eighty persons, allowing a buoyancy power of three hundred weight for each person.

The Duke of Northumberland has offered a distinct premium for the best life boat.

The Crystal Palace is still being crowded every day, at least there is no falling away of visitors. It is expected that the Exhibition will olose in the middle of October. Several contributions have recently been made to the American Department: they are chiefly agricultural implements, with some very handsome light carriages. I still miss an American Fire Engine—a number of them might easily have been sent; if they had been, we should have had more to boast about, as they would have stood No. 1. McCormick's Reaper attracts a great deal of attention, now, after its trial in Essexshire.

There is considerable talk here about the American Yacht, "The Challenge," which is now at Cowes, and respecting which its Captain, Stevens, has challenged all England to sail her against any number of schooners belonging to the Yacht squadrons of Britain, outside of the Isle of Wight, with a six knot breeze. The whole of the Royal Yacht Squadron are afraid of her; the challenge has not yet been accepted. EXCELSIOR.

For the Scientific American.

### Paddle-Wheels and Propellers.

It is admitted, at present, that paddle-wheels are superior to propellers for propelling steam vessels; but whether pre-eminence is justly on the side of the paddle-wheel is worthy of enquiry, as it is a question of great importance and interest. Is it in accordance with any known mechanical law, that a propeller requires a much larger per centage of steam than the paddle? It is true the propeller is a more complicated instrument in its theoretical construction, but, if made right, it is a direct acting propelling instrument as well as the paddle-wheel; it seems, therefore, that there is some room for improvement. It is well known to any mathematician or propeller maker, how to make a *regular screw* propeller, but that is not alone sufficient to bring out the maximum effect of the steam in such a way as to propel the vessel with the greatest economy. As the water on which the propeller acts. is not a regular *nut*, the propeller ought to differ accordingly, that is to the slip, which, if known, it is easy to make it right. First, there is the "Regular Screw;" second, there is the "Irregular Screw;" third, no screw at all. The third is the propeller where the blades form an angle to the centre line in the centre of the propeller. The second is the propeller where the generatrix for the screw momentarily changes its form, and one point (say centre of effort) on the generatrix having a uniform motion around its centre, while having an accelerative motion in the direction parallel to the centre line of the screw. This one seems to be the propeller which should be applied for propelling vessels; it is governed by the slip, thus differing from the regular screws.

The next question is the proper velocity, in order to give the propeller its maximum effect. The proper velocity can be theoretically ascertained, and when this is excelled, there is loss of effect. The velocity depends on the pitch and slip, and can, by them, be proportioned to suit the engine.

The next question is the slip; this depends on the displacement, that is, the greatest sectional area of displacement in propellers of equal diameter, pitch, and velocity. When the diameter or pitch changes, the slip will also change, but this is no measure of loss of effect. The slip is nearly constant, with different revolutions, up to a certain point—a limit—when this point is passed, the slip will increase by the excess of velocity. The above quantities must be arranged to get the maximum effect of the screw propeller. As the screw is the most valuable instrument for propelling vessels, it deserves a series of thorough experiments on two or three vessels and six or more different propellers to test the full value of the best propeller; I believe those experiments would corroborate the above deductions. Experiments, it is true, have been made again and again, but the principle feature has been too often overlooked. N.

### Stephens' Book of the Farm.

Mr. C. M. Saxton, of our city, the distinguished Agricultural Book Publisher, has published this justly valuable "Book of the Farm" in two fine volumes, with Notes by John S. Skinner, now deceased. The "Book of the Farm treats of every branch of agriculture as pursued in Great Britain, where, at the present moment, the science is more highly cultivated than in any other country. The publication of such a work affords us a pleasing evidence of the interest now generally manifested to pursue agriculture according to the best modes of economy—not the wretched economy of starving the soil and sending the manure heap down the Mohawk, a practice quite common at one time—but of applying labor and fertilizers to the soil, &c., in such a manner as to conduce to the most profitable results, present and ultimate. Farming is not an art nor a science that can be learned in a day, as many suppose, but requires experience, reading, study and continual diligence to master not only its leading outlines, but its details. The use of books, for it is to them we principally allude at present, confers this great advantage upon a farmer; he gets within their covers the experience of others, and that for a long succession of years, and in no book with which we are acquainted, is there so much good information upon every branch of farming, as in these two volumes, "Stephens' Book of the Farm." The history of farming, the nature of soils, farm-buildings, all kinds of implements, horses, cattle, sheep, &c., their form, treatment, &c., in short, no single subject, connected with any branch of agriculture, is missed. It is a standard book, without which no Farmer's Library can be complete. It is a complete Guide to the farmer, plowman, cattleman, sheep farmer, field worker, and for dairying.

### The Universal Stair Builder.

This is the title of a large folio, by R. A. Cupper, Architect; it is illustrated by 29 large and fine plates, containing many figures. It may be said the land is flooded with books on geometry; every week some new author comes out to illuminate the world with some new idea of his own, but totally worthless for any practical purpose. It is not the case with this book; it is science reduced to practice,—in other words, the geometry of a useful art, and the author is well qualified for the task he has undertaken. for he is not only a theoretical but a practical man—a skillful scientific workman. The art of stair building is a very elegant one, and in joinery, let us here say, our carpenters have much to learn, as it respects real *good work*, and from this book *they* will learn much, as well as he who makes stair-building alone his profession. A few years ago *slush work*, (we can call it nothing else), did very well, and still there is too much respect paid to quantity, however bad; but owing to the great number of fine buildings erected within the past few years in our city, a better taste has become prevalent. First class joiners will become more and more demanded and respected, and such men cannot be reared nor made without the study of such books as this one. This book is a great improvement on Nicholson's; it contains many new forms and superior methods of working. Its price is $6, and it is sold at No. 240 26th street, corner of 9th avenue.

### Route to New England.

We alluded, in our last number, to the superior comforts of steamboat travelling during the warm season, and now we take occasion to say to such of our friends as are intending to visit the New England States, to avail themselves of the splendid accommodations afforded by the Fall River route. The steamers Bay State and Empire State, for speed, comfort, and every other qualification which can, in any way, contribute to the ease of passengers, are unsurpassed, we might say unequalled; and the company, of whom Messrs. Tisdale & Borden, 70 West street, are agents, deserve, and are receiving a patronage commensurate with their endeavors. One of the advantages of this route is, that passengers are landed at Fall River, at daybreak, affording an opportunity for a good night's rest, and after a ride of two hours, while the atmosphere is cool, the train reaches Boston in due season for breakfast. We have tried every route to Boston, and until within a few days we had not the pleasure of contrasting the difference, and as we know many of our friends will be passing back and forth, we thought best to give them a hint as to the best route. The boats start from pier No. 3, North River.

### "Stop Five Minutes!"

Such was the exclamation of the conductor of the train on the Fall River and Boston Railroad, as the cars stopped at Bridgewater recently, when we were a passenger. We like these announcements on stopping at stations. They give passengers definite information how long to remain outside of the cars. The idea was new to us, but one that could be adopted on all railroads, much to the convenience of passengers.

[The above is from a cotemporary, and on reading it we almost wondered that our brother editor ever found his way to Boston and back—can't have seen much of the country. It is, however, a peculiarity of the profession to remain at home. The suggestion will make our railroad conductors laugh.

### Fairs and Mechanical Exhibitions.

The Fair of this State, (N. Y.) will be held in Rochester, on the 16th, 17th, 18th and 19th Sept. We hope it will be a good fair.

The Fair of the American Institute will be held at Castle Garden, this city, on the 1st October, and will continue throughout the month.

The Ohio State Exhibition will be held on the 24th, 25th, and 26th of September at ——

The Maryland State Fair, will be held in Baltimore on the 23rd, 24th 25th, and 26th of next month.

Rhode Island State Agricultural and Mechanical Exhibition, at Providence, Sept. 10th, 11th, and 12th.

New Hampshire State Exhibition, at Manchester, early in Oct., and will continue three days.

We hope that all these Fairs will be well attended, and well managed. They do much good when properly conducted.

### Daguerreotype Pictures.

A few days since we stepped into the elegant saloons of Messrs. M. A. & S. Root, Daguerrean Artists, 363 Broadway: we noticed among the superb specimens on exhibition, several views illustrative of the sentiments embraced in that touching song, "The Old Arm Chair." The conception is one of the happiest hits we have seen for a long time, and the execution bestows the highest credit upon the artists. We esteem it an object of rare interest, and advise all our friends, who have the opportunity to call in and take a look. The above gentlemen are second to none in the wide world for their skill in the art of taking good pictures.

### Fossils from the Yellow Stone River.

Dr. Evans, U. S. Geologist, who has recently travelled down this river, found near its banks the shoulder blade of a mastodon, measuring nearly three and a half feet across; also, some enormous foot bones of the same animal. He also found the head of a snake, shells, and other fossils in the same locality

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[Correspondence of the Scientific American.]

**American Association for the Advancement of Science.**

ALBANY, N. Y., Aug. 27, 1851.

CLOTH FOUND IN THE OLD MOUNDS.—Dr. J. W. Foster, U. S. Geologist, read a paper on several specimens of cotton cloth found in one of the ancient mounds, in Charlestown, Jackson Co., Ohio, by a Mr. John Woods. The manufacture of the cloth was attributed to another race—a previous one—to that of the present Indians. It was presumed they were the same as the old Peruvians who were acquainted with making cloth while our Indians were not.

RATTLESNAKES —Dr. H. Salisbury, chemist of the State Agricultural Society, read a paper on the "influence of the poison of the rattlesnake on plants." The experiments instituted gave curious and interesting results regarding the poisonous effect of the venom on the structure of plants, but after all, as remarked by Prof. Agassiz, it was a very inconclusive paper.

OBSERVATIONS TWICE IN ONE NIGHT.—Prof. Mitchell said that it had been doubted whether the repetition on the same night, of the observation of a star was of any value. In order to give the opinion of an impartial astronomer, he read an extract from a letter from Professor Challis, of the observatory at Cambrige, England, dated November 21, 1849, who writes that in his opinion a repetition on the same night of the observation is very essential.

Prof. M: now began minutely to explain his instruments, and observed in the first place that he had not, as yet, brought them to completion; but, like others, he was highly gratified at the success already obtained. His greatest difficulty had been in devising means to get rid of slight variations observed; and the task was more difficult as the differences were more minute. Up to the present time; he had not obtained observations of declinations directly, but differences of declination. He gave an account of his observations made upon the diameter of the sun since the New Haven meeting, and showed by their accuracy the capabilities of his instrument. He then showed its power of measuring stars far apart, and that the work of different nights could be recorded in the most perfect manner on the same plate. The observations of one night were recorded on five of ten wires viz. first, third, etc., and on the succeeding night, observations were recorded on the alternate wires; the second, fourth, etc., and with the most beautiful exactness.

RELATION OF THE CHEMICAL CONSTITUTION OF BODIES TO SIGHT.—Prof. Horsford read a long paper on this subject, in reference to metals and colors.

He called the attention, first, to the well known facts that the color of the hair on animals varied, and was more intense on certain portions of the body. The metals also had colors which were affected by the composition. The change of color in summer and winter was also a well known fact. He enumerated many metals which changed their color by the simple process of heating. These were phenomena which ought to be investigated by means of chemistry. The change of tint is without change in chemical composition. The law appears to be that metals pass from a lighter to a darker tint. In charring wood we have a change from a lighter to a darker tint.

He illustrated how the compounds of the several metals as they became more divided in their molecular structure varied. He exemplified them by the series of compounds of lead with oxygen, which as the oxygen prevail ed, the colors became lighter. This was in keeping with discoveries made by Liebig and other eminent chemists whom he named.

The conclusions of Prof. Horsford were: The color of bodies depends upon the extent of the surface of their smaller particles or groups of atoms.

Transparency depends upon the arrangement of lesser atoms in certain order, constituting large groups.

Whiteness depends upon such extent of surface of the groups of atoms as shall reflect all light, or upon such number of these plates produced by pulverizing transparent bodies as will reflect all the light.

Blackness depends upon the subdivision of groups to such minuteness that they no longer reflect light, or by producing interference destroy it.

Heat by subdivision causes darker shades He also observes in a note that there seem to be successive scales of colors produced by heat.

Prof. Hare stated that he had made many experiments with calcium. He complained, that he had made certain discoveries of calcium, which had never been noticed, while fame attributed the discovery of calcium to Sir Humphrey Davy.

Prof. Smith, of Louisiana, did not agree with Prof. Horsford, in some of his conclusions, showing that there were numerous exceptions in the mineral kingdom. There has recently been discovered the Amorphous or Black Diamond. The diamond is generally supposed to be a clear transparent substance; yet here was a specimen of a black variety, which was proved, by the investigations of Dufresnoy, to contain 98 per cent. of carbon. The color of this variety of diamond proceeded entirely from molecular structure.

METEROLOGICAL OBSERVATIONS —Prof Guyot, of Cambridge, read a paper on this subject. He showed the importance of these observations to the thorough knowledge of meterology, and circulated plates an sheets prepared to direct observers as to the classification of the clouds, and giving the form in which the observations, and indicating the time and manner in which the notations ought to be made He exhibited, also, the instruments provided by the Association, such as psychrometers, thermometers, &c. Printed tables were also exhibited, which exemplified how the association had published the various mean results which had been obtained in one place. For instance, the table exhibited at North Salem, in Westchester county. In the month of June, each day there was taken three times, at the hours of 6 A. M., 2 P. M., and 10 P. M., observations of the meterologic state of the atmosphere, as follows :—

The phase of the moon, the barometrical indication, the heighth of the thormometer, direction and force of the wind, the plants in flower, the migratory birds first seen, the state of the psychrometer, the force of vapor, humidity, the state of the rain gauge, the state of cloudiness, with notes of the various kinds of clouds visible.

Prof. Guyot stated that there were but fifty places of observations as yet established, and he exhibited how very small a portion of this continent had as yet been covered by those fifty stations. He pointed out the vast table land which reached from the Mississippi to the Rocky Mountains. This vast table land, he believed, exerted more influence on the meteorology of the continent than even the Rocky Mountains.

ZODAICAL LIGHT.—Prof. Olmstead read a paper on this subject, and the results of a series of observations on the Zodiacal Light, made at Yale College during six years, from 1833 to 1839. He adverted to the general ignorance prevalent respecting this body, and enumerated several causes which render continual observations difficult, such as the presence of clouds, of the Moon, of Venus, and of Jupiter, as also the low angle which the direction of the Zodiacal Light makes with the horizon at certain seasons of the year. He next offered an accurate description of that body, and a drawing exhibiting the phenomenon as it appears at the time of the vernal equinox.

The professor next proceeded to inquire into the nature and constitution of the Zodiacal Light, as its length, its duration, its motions, and the material of which it is constituted. It appears that the length or elongation from the Sun varies much at different seasons of the year, and not only apparently, but really, being sometimes below 60 degrees atone time, and again reaching in a few and rare instances, to 120 degrees. An elongation of 90 degrees from the Sun, implies that it reaches to the Earth's orbit, and it must of course sometimes reach far beyond it.

The motions of zodiacal light are such as to indicate the revolution round the sun, and this fact was shown to be accordant with the views of La Place. The material of which this body is constituted appears to have great analogies to that which forms the tails of comets included under the general appellation of nebulous matter, being like that in its tenuity, transparency, shape, and even shade of color.

Finally, Prof. O. proceeded to the question "whether or not the zodiacal light is the origin of the Periodical Meteors of November and August, particularly those of November." He said that he does not assert positively that this is the body which affords meteoric showers.

This subject is still a mystery to Astronomers.

SEEING THE BLOODVESSELS OF THE EYE.—Edward Hitchcock, Jr., stated his "observations on the experiment by which some persons may see the arteries of their own eyes." He showed how some persons had a faculty of seeing the blood vessels of their own eyes Sir David Brewster had made the same remark A certain professor stated that only persons who had large pupils can see their own eye. But his experience led him to believe that it was not confined to persons with large pupils. We had thought that every person had this faculty; we can see, by a simple experiment, all the blood vessels of the eye. It is thus performed:

Let a lamp be held in one hand, and keeping the eye steadily directed forward, move the light up and down on one side of the line of vision, when an image of the blood vessels of the eye will be observed like the picture of a plant.

AIR FOR CONVEYING MECHANICAL POWER.—Lieut. Hunt, of the U. S. Engineers, read a paper on this subject. He said :—Mechanical power is among the chief elements of wealth, and is of great value in the political economy of a State. He was about to bring forward a new system of economy in the use of a mechanical power which was now entirely lost. He exemplified his meaning by citing the immense power which was lost at Rochester, by the formation of the ground over which the Genesee River flowed, and which by his project might be economically applied to tubes to condense air which might then be made to supersede steam, as it would do away with the the use of fuel to keep up the power which was chiefly used in manufacturing. He stated that Pepin had proposed the same project, thongh not so fully or on as large a scale as he thought it might be applied. For all stationary power, this was invaluable, especially to localities where it was deemed advisable to establish manufactures. This principle was illustrated by the experiments made by the atmospheric railways, in which it was shown that atmospheric pressure might be applied for great distances. The principle was established, as far as the railways were concerned, though it was true the stockholders had to suffer some. It would also enable large central establishments to be formed, which by means of exhaustion or compression pipes, the power necessary for manufactures and machinery might be conveyed in the same manner as gas or water itself. Thus the space, attendance, risk and disagreeableness of steam generating will be saved, while all required power would be purchased from the power manufacturers, and distributed through air wains, just as in gas or water distribution.

By consulting the Scientific American he will find this subject elucidated.

MEERSCHAUM OF ASIA MINOR.—Prof. Smith late from Asia Minor, read an interesting paper about this substance found on the plains of Eski Sher.

It is found at various depths, in a species of calcareous breccia, containing masses of the rocks of the surrounding mountains, where may be found all that is found in the plain except the Meerschaum, the origin of which he was inclined to attribute to the change produced upon carbonate of magnesia by waters containing silex. It was doubtless explored at this very place by the ancient Greeks; the use, however that, they made of it is unknown to us. The companies who now explore are Turks, and those who labor are paid proportionally to what is extracted; and as the value of this substance increases greatly in proportion to the size of the mass, the business is of a precarious nature, and in many instances is a cause of great loss to the miners, while at other times they procure pieces affording large marketable specimens, and their profits then are proportionally good.

The mining for this substance is carried on with the same eargerness, and its yield is as precarious as that of gold. Specimens were exhibited showing both its mineralogical and geological character.

DOCTRINE OF CHANCES.—Prof. Pierce preented this subject thus:

If a person were to throw a thousand marbles on the floor, what probability is there that, when they ceased rolling, one hundred of them should be found close together, so that they might be covered by a hat? This problem, or rather the principle involved, had been discussed by Prof. Mitchell, of England, in the Philosophical Transactions for 1776, wherein he considers the distribution of the stars in the heavens, and attempted to show the probability that there existed a physical connection between some stars, from the fact that they were close together and supposed he had given the true solution. He had not by any means. Prof P. now used some algebraic formulæ to show his own theory, and spoke at length on the subject,—but still nothing was made out of it.

INDIANS OF CALIFORNIA.—Dr. J. L. Leconte read a very interesting paper on the characteristics of these Indians. He stated that the Oregon Indians did not differ from those of California.

The special difference between them and the eastern Indians, consists in the greater extent of face, with smaller and narrower cranium, a less decided obliquity of eye, a greater flatness of nose, dependent on a greater breadth of the alœ, and a less firm cartilage; greater protusion of lips, and a more pointed chin. The last is a deceptive character, and may be produced simply by a greater expansion of the face below the eyes. The color varies, being much darker in some tribes than the others, and is usually much enhanced by their dirty habits as they never wash any portion of their bodies, except in summer, as relief from the excessive heat.

The other characters more clearly separating this from allied races, are the greater abundance of hair on the body—many of the males having quite as much hair on their legs as is common in our own race. They have likewise much more hair on their faces than other Indians; always have hair on the axilla. This character is wanting in the females. The differences in form between the sexes are more apparent than in any other race. The males are almost always slender and well proportioned, while the females are short, broad, and entirely destitute of all symmetry.

In psychical character these nations show still stronger differences from the eastern tribes. Quiet and submissive, the natives living with the whites have assumed a servile condition which under no circumstances could have been impressed on the eastern Indian.

[Remainder next week.]

**To Prevent Horses Being Teased by Flies.**

Take two or three small handsful of walnut leaves, upon which pour two or three quarts of cold water; let it infuse one night and pour the whole next morning into a tea-kettle and let it boil a quarter of an hour; when cold it will be fit for use. No more is required than to moisten a sponge, and before the horse goes out of the stable, let those parts which are most irritable be smeared over with the liquor, namely, between and upon the ears, the neck, the flanks, &c.

[The above we do not give on our own authority, but on another's; as it can be tried without any expense and but little trouble. If good, it should be universally known, and there is no other way to test its value but by experiment.

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# New Inventions.

### Improvement in Machinery for Making Pails, &c.

Mr. Elijah Whiton, of Hingham, in Plymouth Co., Mass., has taken measures to secure a very excellent improvement in machinery for making pails, buckets, and all such hollow wood-ware out of solid blocks of wood. The block to be acted upon has peculiar movements, one a rotary and the other a rectilinear, whereby the block is fed up to the saw in such a manner as to be, when sawn, a single spiral sheet or scroll, or in concentric layers or sheets. The saw frame and block, when desired, may be placed in an inclined position, so that the sawn spiral sheet or scroll will be conical in form. A spring is placed upon the saw frame, by which the saw, when it runs fast, works with a very smooth instead of an irregular motion, as is commonly the case. This machinery is adapted for wooden cylinders, which can be extended into tubes, and for all the kinds of vessels referred to. We have seen various samples of the pails made by this machinery, and can speak confidently of their qualities. It will be understood that a sawed scroll, with a bottom put in, and then hooped, forms a pail.

### Improvement in Bee Hives.

Mr. Robbins H. Stevens, of Litchfield, Hillsdale Co., Michigan, has taken measures to secure a patent for an improvement in Bee Hives, consisting of a series of boxes placed in a rectangular case, and which are so arranged, that but four boxes are used for one swarm of bees having communication through all the boxes; but each box has an opening in front, and the whole four openings placed directly in front of a square tube passing through the front board of the case, but with a passage in it for each box. By this means any of the four boxes may be taken from the hive, with the honey it contains, without disturbing the bees or the other three boxes.

### New Lubricator.

Mr. T. Mingus, of Lanesboro', Susquehanna Co., Pa., has invented and taken measures to secure a patent for an improvement in an apparatus which he terms the "Universal Oiler," for lubricating the bearings of axles, &c. He employs a roller covered with cloth, or any other suitable material, secured in a vibrating frame, having two arms connected together by rods. This roller touches the bearing of the shaft or axis, and revolves in an oil cup below, in which there are coiled springs pressing on the arms spoken of which keep the lubricating roller, continually in contact and revolving with the bearing which it lubricates.

### Improvement in Saw Mills.

Mr. Edwin Weed, of Westport, Conn., has taken measures to secure a patent for an improvement in Saw Mills, by causing the saw to be operated by chains made fast (each chain) at one end, to guides holding the saw at one end, the other ends of the chains being secured to pulleys which receive a vibratory motion and operate the saw. The usual sawgate and connecting rod are dispensed with and additional saw space is obtained. Any number of saws may be used upon the same plan. This improvement is considered to be a valuable improvement, and Mr. Charles Crofut, of Westport, has become the assignee of the invention.

### Substitute for Shoe Leather.

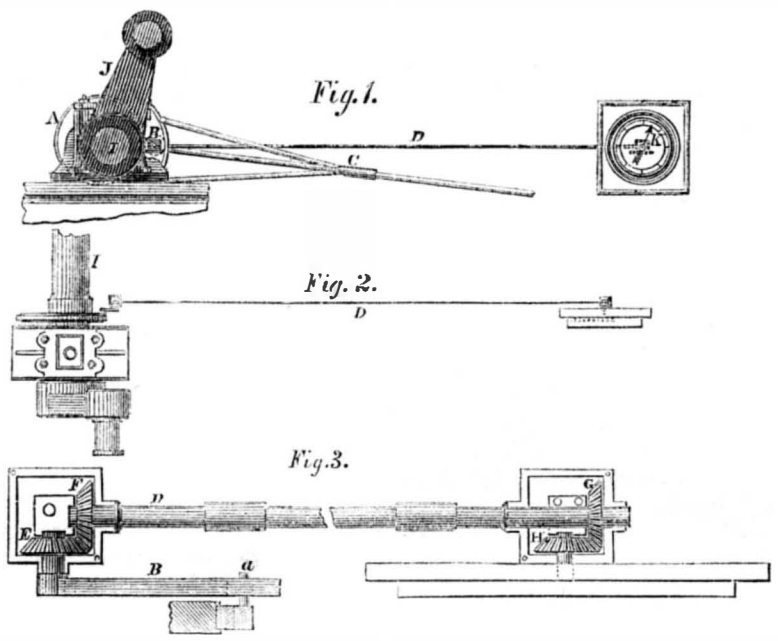
There is an establishment at Abington, Mass., for grinding up the chips and shavings of leather which are cut off by the shoe and bootmakers, and which have hitherto been burnt or thrown away. These are ground to a powder and mixed with certain gums and other substances so thoroughly that the whole mass becomes a kind of melted leather. it is then rolled out to the desired thickness, and is quite solid and water proof. This article will soon be offered in the market.—[Exchange.

[Let the people look out for the poor shoes from that quarter, if it is used for soles or uppers.

## HUTCHINS' IMPROVED CRANK INDICATOR.

The accompanying figures represent an improvement in an apparatus named a "Crank Indicator," invented by Mr. Samuel B. Hutchins, first Engineer of the Ontario steamboat, on Lake Ontario, commanded by Captain H. N. Throop. A patent was granted for it on the 3rd of June, 1851.

Figure 1 is a side elevation of a portion of a steamboat engine, showing the working of the Indicator; figure 2 is a minute plan of the same; figure 3 is an enlarged plan. The same letters refer to like parts. The object of the invention is the communication of motion to an Indicator from a pin secured in the band or rod of the eccentric which works the valves, the said pin acting upon a small crank and giving a rotary motion to the spindle upon which it is secured, and by a small shaft and bevel gearing to the Indicator, which has a rotary motion corresponding with that of the



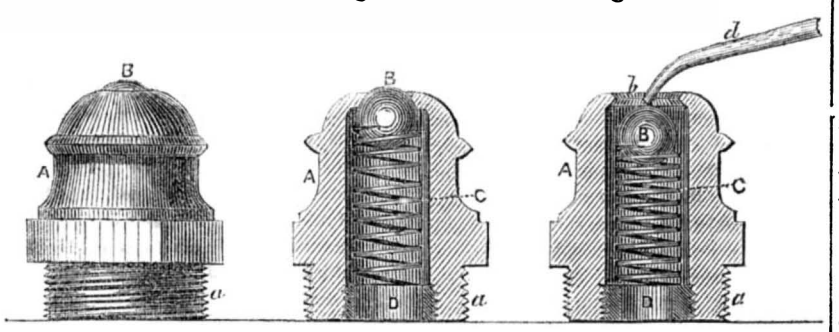

crank on the main shaft of the engine. A is the eccentric band on the main shaft, I; and J is the crank; C is the eccentric rod to work the valves; K is the dial of the indicator, the arrow being the pointer. There is a small spindle made of a fine steel rod, and hung in suitable bearings parallel with and at a short distance from the main shaft. It carries a small crank, B, at one end, and on the other is the bevel pinion, E, fig. 3. It is united by a steel pin, *a*, to the band of the eccentric, and there is a slot in the small crank, B, in which the pin, *a* works; the eccentric, A, therefore, will, by this arrangement, give a rotary motion to the bevel gearing, E F, in the box shown open in fig. 3; D is a small shaft which transmits the motion from the bevel gearing spoken of, connected with the eccentric on the main shaft, to the bevel pinions, G H, in another box, and connected to the indicator pointer, as shown in figures 1 and 3. Every pair of bevel pinions is of the same size. The arrangement shown is for an indicator placed at the side of the engine room. This indicator occupies but very little room; as the spindles do not require to be more than about half an inch in diameter, and the wheels not over one and a half inches. It is exceedingly convenient and useful to the engineer; at his right or left hand—where the indicator may be placed, he sees at a glance the position of his crank, and knows exactly at what angle it is in relation to the piston rod, a very important thing indeed.

This patent has been purchased by Mr. G. S. Wormer, of Oswego, who is full assignee. We have a certificate before us of the Captains and Engineers of all the steamboats on Lake Ontario, of the Ontario and St. Lawrence Steamboat Co., certifying that they have used it on the boats to which they are attached, and that they deem it a valuable improvement and superior in every respect to any other device used for the same purpose. Its advantages they state to be "simplicity of construction; absence of liability to get out of order; cheapness, and the small amount of space it occupies.

Communications about rights, &c., will meet with gentlemanly attention from Mr. Wormer at the Steamboat Office, Oswego, New York.

## PATENT OIL CUP FOR JOURNAL BOXES.

**Figure 1.** **Figure 2.** **Figure 3.**




The accompanying engravings illustrate a beautiful improvement made in Oil Cups for Journal Boxes, by Mr. Aaron Richardson, of Bellows Falls, Vt., and patented on the 29th of last July (1851). Figure 1 is a side view of one of the cups, and figures 2 and 3 are vertical sections through the centre. The same letters refer to like parts. A is the body of the cup, which has a screw socket at its bottom, for the purpose of screwing it into the cup of a journal box, or any bearing in which it is to be used. Its mouth, *b*, is made smaller than the inside part below it, to form a valve seat. B is a spherical valve (hollow ball) fitting within. Any other suitable valve may be used, but this is the best. C is a spiral spring within the cup; this spring and the valve are put in through the bottom of the cup, and kept in by a ring, D, which is secured into the socket, *a*, and forms a bearing for the spring which presses under the valve, and causes it to keep the mouth, *b*, closed (as shown in figure 2) when it is not opened by some external pressure. The oil is poured into the cup by pressing the spout of the oil can (as shown in figure 3) upon the ball or valve, which may or may not project above the mouth, *b*, when closed. The spring is made with tension just enough to keep the valve up to its seat, but to yield to the pressure of the can spout, *d*. When the cup is filled up with oil, and the feeder withdrawn, the spring raises the ball into the seat, closing the mouth, *b*. A wick may be used inside of the cup, if desirable, to graduate the feed of oil to the journal. This oil cup possesses a great advantage over the common kind in use, as many bearings of machinery are so situated that it is difficult to remove their stoppers when the machine is in motion, while this one, by a long spout on the oil can, may be easily supplied with oil where the hand cannot easily reach. It can never be left open by forgetfulness, as is often done with others, and for locomotives it will exclude dirt and dust, and can be filled with one hand while the engine is running. The claim is for an oil cup having a valve inside operated by a spring, for the purposes set forth.

More information about this excellent improvement may be obtained of the inventor by letter.

### Patent Revolving Sail-Ship.

The Liverpool papers record the invention, by Mr. F. Watson, a gentleman of fortune, residing in Manchester, England, of a new method of rigging ships, by which the usual method is entirely dispensed with The principal feature in his invention is the introduction of a set of revolving sails, sixteen in number, something similar to the fans of a windmill, which are elevated on a wheel, and are attached to a sort of spindle. As soon as the wind touches these sails, they instantly set in motion the spindle, which acting upon a very simple piece of machinery, propels a couple of paddles. The objects attained are greater speed by means of the paddles, and the advantage of sailing against a head wind. This is a great improvement, as the sails can be pointed with great ease to any point of the compass. Head or contrary winds are not recognised; a stiff breeze is all that is requisite to propel the vessel. The paddle boxes give the hull the appearance of a double-bowed steamboat. He has rigged a model ship, 23 feet long by 6 feet breadth of beam, according to this plan, for the purpose of testing its capabilities. The inventor has secured a patent for his invention, and is sanguine of its success. Should it succeed, it is said that it will cause a complete revolution in the present system of propelling vessels—but it won't.

### Steam Railroad Turn Table.

We learn by the Pottsville Register, that Mr. Wooten has applied steam power to operate the "turn table" of 40 feet diameter, at the engine house of the Port Carbon Railroad. It is effected by means of a shaft 165 feet in length, connected with the stationary engine in the machine shop, some distance off. This simple contrivance, with its gearing, is all concealed from view, and by means of a lever, the ponderous platform sustaining the heaviest engines and tenders is turned either to the right or left or stands still, according to the will of the operator.

### Improvement in Ventilating Cars.

A train of new cars built by Cummings and James, of Jersey City, for the Railroad between this city and Philadelphia, are well constructed and are admirably adapted for ventilating comforts. Besides three circular openings in the roof, a dozen or more small shutters are under the roof, which, by revolving on their centres, can be opened or closed as desired, thus admitting the air, or excluding the rain.

### Reaping by Machinery in England.

Mr. J. J. Mechi, the gentleman on whose estate Mr. McCormick's machine did such creditable work, has published a letter, stating that the said Reaping Machine had been at work all day on his farm, cutting a heavy crop of wheat, with very long straw, partially laid, and that he had arrived at the following conclusions respecting it: "1st. It will cut from ten to fifteen acres per day, according to circumstances. 2nd. The quantity cut depends greatly on the strength of the man who has to remove it from the rake boards. 3rd. The paddle wheels do not injure the crop." He says he is "convinced that all the reaping in England will soon be done by horse or steam machines.

It is desirable in that rainy country to harvest the crops in a great hurry in dry days; there is a prospect of this now being done by machines to the great benefit of farmers.

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# Scientific American

NEW YORK, SEPTEMBER 6, 1851.


### Woodworth Planing Machine Extension.

We understand that, at the recent Planing Machine Trial, in Cooperstown, (noticed by us in No. 49) one of the counsel, not particularly noted for his courtesy, after having poured the vials of his wrath upon the *unfortunate* patentees who have presumed to run their machines, knowing of the existence of the Woodworth Patent, announced that the assignees intended to ask an extension of the patent by an especial act of Congress, based upon the principle of planing by mechanical pressure. The assignees of this patent must have been deeply chagrined at the want of discretion thus manifested, to say nothing of the want of courtesy towards opponents, many of whom, doubtless, are honorable men, and far above the suspicion of piracy. By making such a statement at this early period, the public mind will prepare itself to resist to the last extremity so glaring an act of injustice to their interests. Flushed with the success which has attended their past efforts in obtaining verdicts,—and a re-issue under circumstances which many suppose reflects anything but credit upon the actors in the game, the assignees presume to urge a powerfully vital question upon our Senators and Representatives in Congress; and, as we learn, are now preparing themselves with every means to carry the bill through the next Session of Congress. That it can never be done, we hesitate not to state thus early; and so sure as the sun rises to-morrow, they will only meet disappointment in any such effort to saddle a hideous monopoly upon the American people. We have few legislators who would dare thus to trifle with an intelligent constituency,—trifling it is, because it is in direct contravention of the republican spirit of our patent laws. Such an arbitrary position might be assumed in half-civilized countries, and the writer of this guillotined for expressing his honest conviction, but it will not do here. The American masses are much too intelligent to permit any such encroachment. We are in favor of allowing everything to the Woodworth assignees which justly belongs to them, and that their patent should now exist until the 27th day of December, 1856. We are then in favor of its becoming public property, and shall use our best exertions to accomplish this just end.

Let us briefly examine some points at issue in this question. In the first place, to claim mechanical pressure applied to planing, would interdict the use of any other than such machines as the assignees of Woodworth were willing to allow, as no planing except by hand can be done without mechanical pressure. Mechanics and manufacturers do you know that this claim, once secured, would prevent you the free use of the old Daniel's machine, which has become public property, and is now being generally employed in your shops? Most certainly you would be called upon to pay tribute to an inquisitorial monopoly, with whom the "quality of mercy is not strained." Again, in some instances the owners of this patent have attempted to stop parties from running machines applied to different purposes, which in no way could affect their interests—done for fees, of course. We have no guarantee that this system will not be pursued to an extent not before attempted.

This statement exhibits the tendency of the parties, and it must appeal strongly to the prejudices of our mechanics, whose interests become seriously affected thereby. We call upon the mechanics, manufacturers, and editors, throughout the country, to watch every movement made to further such designs, and be prepared to counteract any influence which may be brought to bear in carrying them forward. We do not mean to be misunderstood in reference to this matter; and, as occasion requires, we shall aim some well-directed efforts at this scheme, and explain the reasons upon which the appeal will doubtless be made to secure the new patent.

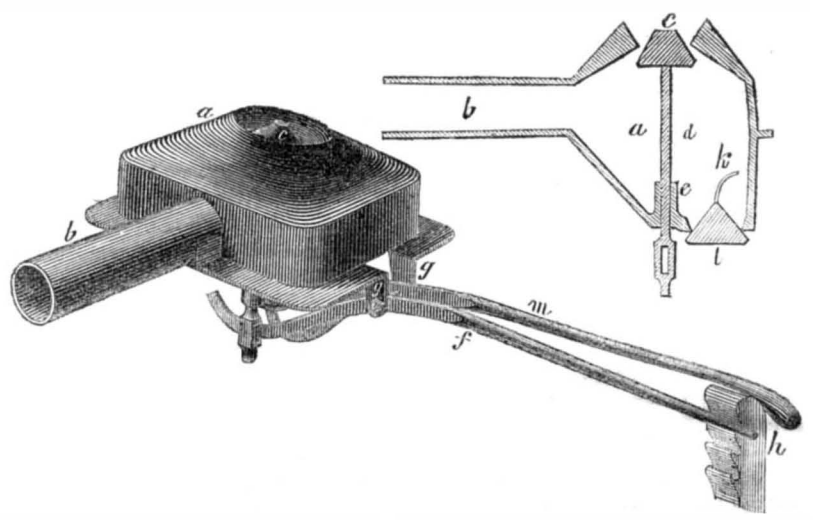
### Prudential Policy.

"The Farmer & Mechanic, American Cabinet, Plow, Loom, Anvil," etc. etc.,—a journal of feeble pretensions, in publishing a letter upon the "static pressure engine," says—"We (meaning four or five Editors), have carefully avoided a single remark on the subject for the present, for reasons not necessary now to state," and winds up the sentence by referring their readers to the "clear and lucid arguments" found in the Scientific American This is the first time our amalgamating cotemporary has ever given full credit to our abilities. We have every reason to bow in deference to that calm and inadequate philosophy which indites the wise policy of carefully avoiding committal remarks upon such a subject. Fallstaff's opinion about fighting is justly appreciated by our neighbor.

### To Subscribers.

The next number will be the last of this Vol. We hope to commence our new volume with a great addition of subscribers. No person, we believe, can invest two dollars in a more suitable manner, both as it respects profit and pleasure, than by subscribing for the Scientific American. Useful and standard information, something suitable for every man and every family, may be found every week in our columns. We have no travelling agents, and have been greatly indebted to our readers for asking their neighbors to subscribe. If every subscriber could get one neighbor to subscribe, we would be enabled to advance the Scientific American as far ahead of what it now is, as it is ahead of its cotemporaries, and as it now is, in appearance and matter, to what it was four years ago.

## PORTER'S IMPROVED FORGE TUYERE.




The accompanying engravings represent an improvement made in Forge Tuyere's, by Mr. Robt. D. Porter, which has received a high character for real merit. The shaded engraving is a perspective view, taken from above, as it is fastened in the masonry of the hearth, forming the bottom of the fire. The tuyere is composed of a cast-iron air box of the form better shown in the sectional view, which is taken vertically; *b* is a tube to the air box, and is attached to the bellows; *c* is a conical valve for rendering the aperture on the top of the air-box more or less open; *d* is the stem of this valve, *f* is the lever to move it. This lever works on a fulcrum pin between the lugs, *g g*; the longer end of this lever rests in the notched standard, *h*, by which means the conical valve can be opened as desired and kept so positioned. *l* is a valvefor removing clinkers from the air box; it is worked by the lever, *m*. By opening the ash-box, *k*, occasionally, the scoria and ashes will drop from the air-box. The form of the aperture of this tuyere together with that of the valve, direct thecurrent of air in the most suitable manner. For some kinds of work a contracted current is required, for others an expanded current, such as for a broad fire; this tuyere presents every advantage in respect to such currents. The motion of the air through the aperture prevents the settling of ashes and cinders, and should any scale obstruct the blast, it is easily removed by working the valve, *c*. Mr. Porter has presented to us numerous testimonials in favor of his tuyere from respectable sources, and those best qualified to judge of its merits, viz., practical men who have used it. It saves a great deal of fuel and labor, as is attested by the said testimonials. The tuyere is durable, and has been used by some for three years, but it never has been, until now, brought prominently into public notice.

The Tuyere is patented, and Mr. Porter is now in this city, and we recommend our friends to give his improvement a candid examination.

### Short Conversations on Mechanics---No. 5.

A. Last week you wished to know something about forces being measured according to the square of the velocity.

Q. "Yes."

A. If the resistance to a moving body is always the same at every point, the proper measure of force is ($W \times v$) the weight multiplied into the velocity, but the whole work which a moving body will perform to bring it to a state of rest, is measured by ($W \times v^2$) or according to the square of the velocity. This is the *vis viva* or living force. Bourne says, "of two balls of equal weight, but one moving twice as fast as the other, the faster ball has four times the mechanical force accumulated in it that the slower ball has. If the speed of a fly-wheel is doubled, it has four times the momentum it possessed before—momentum being measurable by a reference to the height through which a body must have fallen to acquire the velocity given." To explain the subject we will take a train of cars upon a level track, and let us suppose the resistance the same, at whatever velocity; then, if we imagine the train to be running 20 miles per hour, and it is desired to bring it to a state of rest at the station-house, the engineer shuts off his steam, as he has learned by experience, at one mile distant, and he knows the train will be brought to rest in five minutes, at the end of the mile: now, if the same train is made to move with a velocity of 40 miles per hour, he will have to shut off his steam at four miles distant from the station, and the time occupied in bringing the train to rest, will be ten minutes. The force of a moving body—that is, its whole accumulated force, or the total amount it will perform, no matter in what time, in being brought to a state of rest—varies as the square of its velocity multiplied by its weight. This question agitated the philosophers of Europe during the days of Leibnitz and Newton, and the controversy, to the no small credit of mathematics, was rather dropped than ended. Leibnitz asserted the principle that a body projected upwards against gravity, was always as the square of the velocity; in other words, if one velocity would shoot a cannon ball upwards one mile, two velocities would project it upwards four miles; and three velocities, nine miles. The old opinion was, that force was always proportional to the velocity. The world of science was divided upon the subject: Germany and Italy adopted the opinion of Leibnitz, and Britain and a number of the French mathematicians opposed it, and stood fast by the old system. It is singular, indeed, that both parties adopted different measures of force. And when any mechanical problem was proposed concerning the action of bodies, whether at rest or in motion, they resolved it in the same manner, and came to the same conclusions, in a certain sense. Their ideas were, therefore, not inconsistent with each other, and both were therefore true. In measuring the force of one moving body by its effect upon another, there is no doubt but the forces of such bodies are as the quantities of matter multiplied into the velocities; because the forces of bodies of equal products, if opposed, destroy each other. In this way of measuring them, it is evident that the forces vary, not as the squares, but simply as the velocities. There are two ways of computing the amount of retarding forces; they both lead to different results, but both are just, and the one ought not to exclude the other. Thus, if a cannon ball be projected upwards opposite to the centre of gravity; we may inquire how long the motion will continue, or how far it will carry the ball; in other words, the retardation of gravity during a certain time, or while the body is moving over a certain space. If we use the first inquiry as a measure of force, that force will be proportional to the velocity; but if we employ the second as a measure, viz., the length of the line, or distance which the moving body describes, then it will be found that this measure is as the square of the velocity; because to that quantity the length of the line is known to be proportional. Thus, then, are two values of forces directed in this manner, the one proportional to the velocity, the other to the square of it; the one measure is time, the other, distance. Both methods of measurement are perfectly correct and consistent when understood.

Q. "I must say that this is a somewhat abstruse subject to me, but has it anything to do with measuring the power of working machiner, such as the horse-power of an engine."

A. It has not, and when you hear people estimating the force of a machine, and setting it up as increasing in force according to the square of the velocity, then set them down as not being acquainted with the dynamical unit introduced by James Watt, long after the above controversy ceased. In estimating the value of his engines, he assumed as a dynamical unit of a horse-power, 33,000 lbs. lifted one foot high in one minute; this definition is founded on the assumption that the resistance remains the same at every *new* point of space, and pressure must be exerted afresh at every point through which resistance has to be overcome. The unit of measure of the steam engine is ($W \times v$); the unit of measure for falling bodies is ($W \times v^2$).

Q. "This is very plain to me now, viz., that the power of machines (that which I wish to know about) is measured simply by the pressure multiplied into the velocity."

A. Exactly; but remember that you cannot propel a steamship nor a locomotive with a double speed by using simply the double amount of fuel. In experiments made with steamships belonging to the British Mail Line running between Ireland and England, so late as 1849–50, it was found that, all things being equal, the speed was doubled by using about four times the amount of fuel; this was according to the square of the velocity, and accords with the known laws of resistance, which are parallel to gravity.

Q. "In moving machinery of any kind, is there any independent force generated, which is plus of the prime mover? There are centripetal and centrifugal forces, and it has been asserted that the latter is plus the prime mover, and increases with the square of the velocity. Is this so?"

A. It is not, and I should like to hear some of your reasons for making the assertion.

Q. "I forget them all at present, but will try and collect them by next week, and as this is the only information that I wished to have fully elucidated, I hope you will explain it all and I will not give you any more trouble—at least for some time."

A. I will do so.

By the very latest news from Europe we learn that the Great Exhibition is to close on the 15th of Oct. next. The prizes are not to be awarded for some days afterwards.

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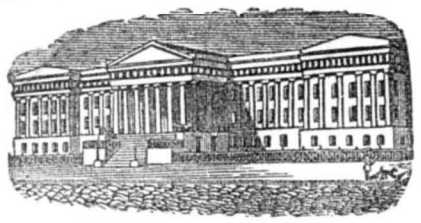

☞Reported expressly for the Scientific American, from the Patent Office Records. Patentees will find it for their interest to have their inventions illustrated in the Scientific American, as it has by far a larger circulation than any other journal of its class in America, and is the only source to which the public are accustomed to refer for the latest improvements. No charge is made except for the execution of the engravings, which belong to the patentee after publication.

## LIST OF PATENT CLAIMS

**Issued from the United States Patent Office.**

FOR THE WEEK ENDING AUGUST 26, 1851.

To David Allan, of St. Louis. Mo., for improvement in Washing Machines.

I claim the chamber or tub, with its narrowed neck and otherwise constructed, substantially as described, in combination with the plunger, which latter, with the clothes wrapped round it, passes through the narrowed neck of the chamber, and pressing forcibly on the water confined within the body of the chamber, drives it violently in the direction of the arrow, and through the body of the clothes, carrying the dirt with it.

To Hiram Carver, of Edinburgh, Va., for improvement in Cabbage Cutters.

I claim the two vertical bars confined to the sides of the feeding box, so as to rise and fall with the movement of the feeder, said vertical bars having handles by which the operator actuates the feeding box, and by the same exertion of his arms, renders the material self-feeding, simultaneously with the reciprocating motion of the feed box.

To B. Gillet & L. Allis, of Hartford, Conn., for improvement in Self Acting Cheese presses.

We claim the combination of the falling frame with the toggle joint levers and the fixed eccentric wedge, acting together and making the upward movement and pressure substantially as set forth and described.

To James Harrison, of Jamestown, N. Y., for improvement in Dental Hydraulic Cups.

I claim the construction of said machine of two or more plates, with vacancies between the same, and with pipes connected thereto.

I also claim the application of water, or any suitable liquid, to the space or vacancy between the plates, for the purpose of hardening and rendering more firm the contents of the cup while on the jaw.

I claim nothing for the outward form of the said plates, nor for the application of the same to the mouth, merely to take impressions.

I also claim the method of using the gate, as described.

To Jonathan F. Ostrander (assignor to A. B. & C. E. Hutchinson), of New York, N. Y., for improvement in Rotary Harrows.

I claim the use of the combination of the spur-wheel, with the hollow axis, for the purposes and in mode of construction substantially as set forth, and their combination with the circular frame, having the face, cog-wheel, and arms attached, for the purpose of producing a rotating harrow, substantially in principle of construction as set forth.

To Geo. McGregor, Robt. Lee, and Thos. G. Clinton, of Cincinnati, O., for improved Padlock.

We claim the combination of the bolt and cavity on the rotating end of the hasp, with the tumblers (two), having the characteristics described, or their equivalents, the tumblers, hasp, and bolt constituting a system of fastenings within and without the casing of the lock, the whole being arranged and operated substantially as described.

To P. H. Niles, of Boston, Mass., for improved Adjustable Tool Haft.

I do not claim the gripe as any novelty, but I claim the mechanism by which its jaws are closed, the same consisting of the eccentric groove, the pin, and the revolving tube, as described.

To G. W. Otis, of Lynn, Mass., for improvement in Insulators for Lightning Rods.

I claim the insulated support and point for lightning rods, consisting of the insulated point and opening in its shank, the insulating cylinder of glass, with its lip or flange, and the wooden collar for securing the whole to the building, all as described.

To Horace Smith, of Norwich, Ct., (assignor to C. Palmer, of New York, N. Y., for improvements in Breech-loading Fire-Arms.

I claim operating the breech-pin directly by the finger lever, as described, in combination with the breech-pin and abutting lever, formed and operating substantially as described and for the purpose specified.

I also claim elevating the charge lifter by the direct contact of the breech-pin carrier, with an arm of the lifter lever, and depressing it by the direct contact of the finger lever, with the other arm of the said lifter lever, as described.

To David Tilton, of Stoneham, Mass., (assignor to himself and Samuel Sweetzer, of Boston, Mass.), for improvement in Padlocks.

I claim the combination of the turning hasp or contrivance, the tumbler and the slide, and its projection, or any mechanical equivalents, the whole being made to operate together, substantially as described.

To Samuel Brown, of Berwick, Pa., for improvement in Lime Kilns.

I claim, first, so forming the fire space in lime kilns, which are fixed at both ends so as to rise gradually from the centre of the kiln, to points above the eyes in each end thereof, substantially as described, for the purpose of so distributing the draft and heat as to secure the ever burning of the stone.

Second, I claim dividing the fire space by a partition wall in the centre into two chambers for the purpose of shifting and regulating the heat required in either end of the kiln, substantially as described, for the more evenly burning of the stone.

Third, I claim, in combination with the fire chambers and partition wall, the ash pits at each end of the kiln, connected by a narrow flue, so that when the eye at either end may be closed, for shifting the heat, sufficient draft will be kept up from the opposite end of the flue, to allow the fire to burn moderately without being entirely extinguished, as set forth.

To Geo. Bacon & R. J. Raven, of New York, N. Y., for improvement in Horizontal Square Pianofortes.

We claim connecting and combining, in the horizontal square pianoforte in one piece of cast-iron, or other metal or metals, the bridge, the brackets, the upper bearing by the flanges, the reverse bearing on the buttons, the application of the long bridge of the horizontal square pianoforte, of the method of firmly securing the whole to the rest plank by means of the screws and the application of the diagonal position of the flange, so as to make both strings of each note of equal length, to metal bridges, on horizontal square pianofortes, in the manner and for the purpose intended, as described.

To C. S. Bulkley, of Macon, Ga., for improvement in means of obviating difficulties arising from defective insulation of Telegraphs.

I claim reversing the connection of the main wire with the poles of the battery, so that the battery acts in opposition to the battery at the other end of the line, in the intervals between the contacts made by the key in writing (in place of merely breaking the circuit), by means of the apparatus and arrangement of wires, batteries, &c, substantially as described, for the purpose of counteracting the effects of imperfect insulation, as set forth.

To Henry Carter & James Rees, of Pittsburg, Pa., for improved Nut and Washer Machine.

We claim the two punches moved at the same time, with different velocities, and in the same direction, in combination with a die box, within which the nut is formed, substantially as set forth.

To J. P. Colrie, of New York, N. Y., for improvement in Machinery for Cutting Glass.

I claim, first, the combination and arrangement of the several parts for giving the reciprocating and circular movement herein described; that is to say, the combination of the bed plate and revolving plate, with the carriage, consisting of three pieces.

Second, the method of guiding the movements and adjusting the several parts of the machine, for the purpose of directing the course of the object to be shaped or figured, in passing the edge of the cutting wheel, by means of movable lettered or named stops and gauges, prepared for particular patterns, and applied to the machine as required, the whole being constructed and operating substantially as set forth.

To D. W. C. McCloskey, of New York, N. Y., for improvement in Self-acting Blow-pipe Lamps.

I claim the use of the safety-valve and escape-pipe and stop-cock, in combination with the blow-pipe of a self-acting blow-pipe lamp, substantially as herein set forth.

To W. T. Richards, of New Haven, Ct., for improvement in machinery for forming joints of Eliptical Springs.

I claim the combination of the hollow die, with the lower die and half circular shears, actuated in the manner substantially as described and for the purpose set forth.

To J. P. Sherwood, of Fort Edward, N. Y., for improvement in Cut Nail Machines.

I claim, first, in combination with knives, or the equivalent thereof, for cutting blanks sidewise from nail plates, a travelling, griping, and heading tongs or jaws opening and closing in a direction perpendicular to the face of the nail plate, and constructed and actuated substantially as herein set forth, to gripe the blank on its flat sides without the necessity of turning it upon edge, as is customary with nail machines heretofore constructed to draw it from beneath the knives, and to hold it while being headed.

Second, I claim the direct acting knife stock, with knives secured to its opposite sides, in such positions, with respect to the stationary knives or to each other, that the knife upon the opposite side, in combination with a double graded cam, or other equivalent actuating mechanism, which shall cause the cutter bar to descend with two impulses, at each of which one knife acts to cut a nail blank.

Third, I claim the relative arrangement of the travelling griping jaws and heading tool, the latter being actuated within the former, and travelling with it.

Fourth, in combination with two sets of knives, acting alternately, to sever nail plates, I claim a reciprocating griping and heading carriage, which, travelling to and fro between the two sets of knives, gripes, heads, and delivers a nail at each single stroke, in alternate succession, at its opposite extremities, whereby much time and labor are saved, and the machinery to cut a given number of nails is condensed into a less space.

To J. H. Swett, of Concord, N. H., for improvement in Spike Machinery.

I claim the method of delivering the spike from the die, by means of the tilting rod and movable nippers, so as to allow the nippers to draw in the succeeding blank underneath the spike, and tip or tilt it out of the die, which prevents the possibility of a spike and blank being in the die at the same time, and the consequent breaking of the machine.

For the Scientific American.

### Salivary Calculus, or Tartar of the Teeth.

I am pleased to see by a communication from a correspondent, in your paper of August 23, that the subject of concretions upon the teeth is attracting some attention: in this manner knowledge for good is often disseminated. It is possible that the articles in your valuable journal may be the means of calling the attention of some among your sixteen thousand subscribers (who might otherwise neglect it) to the importance of a proper care and cleanliness to the organs of the teeth, a healthy condition of which is so essential to the well-being of the whole human economy.

Your correspondent inquires, "Is that substance usually called tartar, found on the teeth, really so?" in answer, I would say that it is generally called so, but it is more properly *salivary calculus*, a name given to it by dental writers. There is considerable difference between the substance found on and around the teeth, called tartar, and that substance called by the same name generated by the fermentation of wine in casks; the one is an earthy and animal deposit from the saliva and mucous secretions of the mouth, the other an acid concrete.

Salivary calculus, or tartar of the mouth, is found more or less in its different stages on and around the teeth of every individual, whether they are accustomed to the use of wine or not; even the animal creation are not exempt, Not long since I saw a clearly defined case of it in the mouth of a dog. The earthy matter entering into the composition of tartar of the teeth, is mostly phosphate of lime; the animal matter is made up of infusoria and the remains of minute animalculæ, the presence of which has been clearly detected by the microscope.

Tartar, or salivary calculus, differs in its relative proportions, as it is soft or hard; at first it is soft and light-colored, but by accumulation and exposure it becomes dark and hard. The analysis of Berzelius gives—phosphate of lime, 79; salivary mucous and salivæ, 13·50; animal matter, 7·50—100. Dr. Dwinell gives—phosphate of lime, 60; carbonate of lime, 14; animal matter and mucous, 16; water and loss, 10—100.

Hard and dry tartar has more earthy and less animal matter than soft; American and English authors attribute it principally to one source—the saliva; the French authors to several. The fact that it is found in greater quantities on the outside of the upper molars, or double teeth, and inside of the lower incisors, or front teeth, which are opposite the mouth of the ducts, from whence the saliva issues, goes to prove its paternity. Tartar itself does not directly act upon the teeth, still its effects upon the mouth, in general, is extremely deleterious, vitiating as it always does its secretions, causing inflammation, abscess, and fungus growth of the gums, and destroying the alveoli, or sockets that contain the teeth—causes them, when perfectly sound, to loosen and fall out; it also, by eating away the gums, gives the teeth that long, dark, and unsightly appearance, and by admitting the air and acrid food to their bony structures, hastens decay, causing toothache and its accompanying evils: it not unfrequently is one great cause of dyspepsia and derangement of the whole digestive apparatus; it also, if allowed to accumulate for any length of time, prevents, by irritation, a proper cleanliness of teeth—the brush cannot be used without pain, as the gums bleed at the slightest touch, hence many suffer their teeth to go to ruin for want of proper cleanliness.

There are many who, from ignorance of the effects of salivary calculus, appear to have a great affection for it, and are extremely loth to part with it, fearing its removal may injure the enamel. When persons, on examining their mouths, find an accumulation of this substance on and around their teeth, I would advise them to have it removed as soon as possible—not by using acids for the purpose, for, as I remarked in a former communication, any acid, no matter whether vegetable or mineral, that will dissolve tartar, will assuredly dissolve the teeth,—but by instruments constructed for that purpose in the hands of the dentist, after which, by using the tooth-brush twice a-day—in the morning when rising (for tartar accumulates freely during the night), and in the evening when retiring—with some simple alkaline dentrifice, will in almost every instance prevent an accumulation of this injurious substance. G. F. J. Colburn, Dentist.

Newark, N. J., 1851.

### Patent Cases---Cultivators.

There were two cases decided before Judge Nelson, at Cooperstown, on the 12th ult., which, to our farmers, are of no small importance. They were motions for preliminary injunctions, 1st by S. R. Tracy, against R. S. Torrey and H. Torrey, for infringing the patent of N. Ide, of Shelby, Orleans Co., N. Y., in cultivators, the plaintiff being the assignee for three counties. The defendants were selling cultivators within the county lines owned by Tracy, viz., Yates, Seneca, and Ontario. The defendants were selling cultivators owned by the plaintiff.

2nd, motion for injunction by E. Chamberlain and others, against J. F. P. Root, and others, for infringing the same patent, the plaintiffs being owners of the patent for the town of Sweden, Brockport, in Monroe Co. Injunctions were granted. We shall notice these cases more at length next week, for the result verifies the advice given by us to certain parties in relation to this affair some time ago.

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### TO CORRESPONDENTS.

W., of Tenn.—It is not possible for us to occupy the amount of room necessary to explain the plus and minus signs, as requested, and then we might fail to do so in a simple manner. Davis's Logic of Mathematics is very clear on the subject.

C. W., of Tenn.—Your plan of a rotary engine is much too complex to warrant an application for a patent, or the outlay of money on experiments. No good result can come from it, we are persuaded. Upon the point of novelty, we think you have a slightly different arrangement from any other we have ever seen, although we are familiar with many others, some of which are not worth one copper.

C. S. & B., of N. Y.—It is possible that claims could be made upon your machine on which a patent would be granted; but such points as you mention as desiring to claim are covered by other patents: for instance, the pressure rollers for keeping the lumber up to the knives; that is the vital principle of Woodworth's patent. The money has not come to hand yet.

E. S. Z., of Md.—The machines we advertise would be suitable for your business, but a new set of chisels would be required. They could be obtained from the manufacturers at a reasonable rate. Turning lathes can be obtained here.

C. E. A., of Me.—We do not see how you can obtain a patent for such modifications as you specify. In the patent granted to Mr. H. he claims, "and anything substantially the same," which will, in our opinion, effectually cut off your prospects. Don't spend any more money upon it.

O. N., of Tenn.—Send on your model as soon as possible, and it will be taken up immediately on its receipt. We shall press your case as fast as possible, and have not the slightest doubt of success.

J. M., of Ga.—We recommend to your attention the remarks of Mr. Conger in our last and this number. You are perfectly right about what is termed centrifugal force.

B. N., of Va.—By reference to the advertisement of A. Kilborn, in another column, you will notice he has on hand the pump chains.

R. E., of N. Y.—You had better address John Gibson, of Albany; he will furnish you all the particulars about the Woodworth machine. We send you one of his cards by mail.

J. B., of N. Y.—We certainly hope the Mechanics' Institute will succeed; Col. Pratt, the President, is a worthy man, and his name adds weight and character it might not otherwise obtain. The Colonel is a true mechanic, and a regular subscriber to the Scientific American. We must all take strong hold and pull steadily together.

G. E., of N. Y.—Iron blinds, constructed on a similar plan to yours, but rendered more perfect in their operation, by an important addition not described by you, are in common use in this city.

T. E. S., of Pa.—Send on your model and a slight description of it, and portray in writing what its particular advantages are over the usual alloys, and enclose the government fees ($30) and we will prepare your application speedily.

W. P. E., of D. C.—Your $2 was received on the subscription. The box from the Patent Office was received duly. How much do we owe you?

F. S. C., of Mass.—Your contrivance for indicating the distance run by vehicles is believed to be new and patentable. It depends much upon its management whether it would pay or not. This is better decided after trial.

B. H. W., of Ct.—We cannot think the invention at all similar, but our opinion may not coincide with that of the judge. We think, however, it will. Wait and see what course will be adopted.

Z. S. D., of Mass.—We wrote you immediately upon receipt of your letter, that Messrs. McFarland & Bisco, of Worcester, Mass., manufactured malleable iron. No charges are made.

S. C., of N. Y.—We have examined the subject of your sketch, and regret to state that the arrangement is not patentable. By reference to No. 1, Vol. 6, you will find the same invention.

D. E. A., of Miss.—Glad to hear from you with such a fine list of subscribers. We hope to merit your good opinion for the future as it appears we have in times past.

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Money received on account of Patent Office business for the week ending August 30:

A. F., of Mass., $20; R. V. DeG., of N. Y., $52; W. W. L., of Conn., $51; B. & W., of Ct., $20; A. S., of N. Y., $5; J. O., of N. Y., $40; P. H. K., of N. Y., $50; S. C., of Ct., $25; H. K., of Va., $11; W. S., of R. I., $20; G. W. T., of Mass., $30.

Specifications and drawings of inventions belonging to parties with the following initials, have been forward to the Patent Office during the week ending August 30:—

W. W. C., of Miss.; A. F., of Mass.; J. B., of N. Y.; M. & F., of L. I; H. A. L., of N. Y.; S. C., of Ct.; J. O., of N. Y.; A. S., of N. Y.; A. K., of N. Y. (2).

### Postage on Books.

Subscribers ordering books or pamphlets through us are particularly requested to remit sufficient to pay postage, or we cannot attend to their orders. We are obliged to pay from 10 to 50 cents every time a pamphlet or book is sent by us through the post, and the justice of our demand is made apparent

### Patent Claims.

Persons desiring the claims of any invention which has been patented within fourteen years can obtain a copy by addressing a letter to this office; stating the name of the patentee, and enclosing one dollar as fee for copying.

### Back Numbers and Volumes.

In reply to many interrogatories as to what back numbers and volumes of the Scientific American can be furnished, we make the following statement:

Of Volumes 1, 2, and 3—none.
Of Volume 4, about 20 Nos, price 50 cts.
Of Volume 5, all, price, in sheets, $2; bound, $2,75.
Of Volume 6, all back Nos., at subscription price

### New Edition of the Patent Laws.

We have just issued another edition of the American Patent Laws, which was delayed until after the adjournment of the last Congress, on account of an expected modification in them. The pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office We shall continue to furnish them for 12 1-2 cents per copy.

## ADVERTISEMENTS.

**Terms of Advertising:**

One square of 8 lines, 50 cents for each insertion.
" 12 lines, 75 cts., " "
" 16 lines, $1,00 " "

Advertisements should not exceed 16 lines, and outs cannot be inserted in connection with them at any price.

## American and Foreign Patent Agency.

**IMPORTANT TO INVENTORS.**—The undersigned having for several years been extensively engaged in procuring Letters Patent for new mechanical and chemical inventions, offer their services to inventors upon most reasonable terms. All business entrusted to their charge is strictly confidential. Private consultations are held with inventors at their office from 9 A. M., until 4 P. M. Inventors, however, need not incur the expense of attending in person, as the preliminaries can all be arranged by letter. Models can be sent with safety by express or any other convenient medium. They should not be over 1 foot square in size, if possible.

Having Agents located in the chief cities of Europe, our facilities for obtaining Foreign Patents are unequalled. This branch of our business receives the especial attention of one of the members of the firm, who is prepared to advise with inventors and manufacturers at all times, relating to Foreign Patents. In the item of charges alone, parties having business to transact abroad, will find it for their interest to consult with us, in preference to any other concern.

MUNN & CO., Scientific American Office,
128 Fulton street, New York.

**TINMEN'S IMPROVED MACHINES.**—Dealers and workers in Tin Plate and Sheet Metals are hereby informed that the subscribers have the exclusive right of manufacturing "Wright's Patent" Sheet Iron Folding Machine; No. 1, two and a half feet, and No. 0 five feet in length. "Flanders' Patent" Rotary Shears, for Cutting Circles of 3 to 20 inches in diameter, from tin and other metals, and turning an edge on the same at one operation. Also for cutting circles from paper or pasteboard. "Walker's Patent" Tin Folding Machine; No. 1, 17 inches, and No. 0, 20 inches in length, (a new article). By the use of the above much labor may be saved and many kinds of work done that no other machine will do. The above, together will all kinds of Tinners' Machines and Hand Tools, of superior quality, are for sale at our Works, East Berlin Station, on the Middletown Railroad, and by our agents in most of the principal cities. ROYS & WILCOX. 51 2*

**TO MILLERS.**—My attention has lately been attracted by an extensive hand-bill, circulated in the West and South by a Mr. James M. Clark, or some one interested in vending a certain Patent Mill of his invention. In said handbill strong inducements and flattering encouragements are held out to induce the milling community to purchase said Mill for the purpose of re-grinding the entire offal by a continuous operation; and through the medium of your paper I wish to caution the public, that, by adopting the plan suggested by Mr. Clark, they will surely infringe "Bonnell's Process," which was patented Aug. 14, 1849, and they will be held accountable. Persons wishing rights of "Bonnell's Process," can have them on low terms by applying to the patentee, at Tecumseh, Mich. D. P. BONNELL. 51 3*

**A LARGE LATHE FOR SALE CHEAP.**—A new Lathe, 16 feet long, swings 31 inches, turns 12 1-2 feet; has 25 changes of screw gear, weighs about 5,000 lbs., has counter shaft, &c. Price $550, cash. Apply to S. C. HILLS, 12 Platt street, where the lathe can be seen. 51 4*

**HUTCHINS' CRANK INDICATOR.**—The subscriber having purchased the entire right of Hutchins' Patent Crank Indicator, would respectfully inform the public that he is ready to supply orders or sell territory. The Indicator has been used aboard the "Northerner," "Bay Stae," "Cataract," "Niagara," "Ontario," and "Lady of the Lake," the Captains and Engineers of which have all given their testimonials of approbation. Address G. S. WORMER, Steamboat Office, Oswego, N. Y. 51 6*

**CHILD'S PREMIUM SAW MILL**—To Plank Road Contractors and Lumbermen generally.—The subscriber having obtained a patent for improvements in circular saw mills, by which large timber can be cut with as great facility as small, and with one half less power, and one-third less waste of timber than by ordinary mills, offers mills and rights on reasonable terms. For illustration see Scientific American of March 15th, 1851. O. C. CHILD.
Granville, Ill., May, 26, 1851. 39 9eow*

**PRAIRIE FARMER WAREHOUSE,** Chicago, Ill.—The undersigned are prepared to manufacture extensively various kinds of labor-saving machines for farmers. Patentees having good, well tried inventions which they would like to introduce into the West, are desired to inform us of them.—With those having the best machines of their kind, we will be glad to make arrangements to manufacture, paying a stipulated price on each machine sold. We buy no rights. Our shop is centrally located, with a 40 horse-power engine, and we believe we can offer good inducements to patentees. J. S. Wright has a large acquaintance with western farmers, having for more than ten years published the "Praire Farmer," the leading agricultural paper in the West; and Obed Hussey, the first inventor of the reaper, is a practical, good mechanic. WRIGHT & HUSSEY. 502*

**JACK-SCREW FOR RAISING BUILDings,** Locomotive Engines, and other heavy bodies, also double and single threaded vice screws, mill screws for raising mill stones, cheese press, carpenter's clamps, and music stool screws, all of which are warranted to be superior articles: manufactured and for sale wholesale and retail by Tolman & Brown, Hinsdale, N. H. "We have examined the screws manufactured by Messrs. Tolman & Brown, and believe them to be of the finest quality, both as regards the workmanship and durability. MUNN & Co." 484*

**CHICAGO SEED STORE AND AGRICULtural Warehouse.**—The undersigned have formed a co-partnership under the name and style of Starkweather & Hooker, for the purpose of establishing a Depot in Chicago for the purchase and sale, on commission or otherwise, of Seeds, Agricultural and Horticultural Implements, Machines, &c., of every description, respectfully solicit the attention of agriculturists and manufacturers of implements, to our establishment, and give assurance that every facility will be offered for ready sales on the most advantageous terms. C. R. STARKWEATHER,
484* J. W. HOOKER.

**RAILROAD CAR MANUFACTORY.**—TRACY & FALES, Grove Works, Hartford, Conn. Passage, Freight and all other descriptions of Railroad Cars, as well as Locomotive Tenders, made to order promptly. The above is the largest Car Factory in the Union. In quality of material and in workmanship, beauty and good taste, as well as strength and durability, we are determined our work shall be unsurpassed. JOHN R. TRACY,
39tf. THOMAS J. FALES.

**WANTED.**—A situation is wanted by a person capable of planning and constructing furnaces for smelting iron ore, or erecting rolling mills. He is an experienced mechanic, thoroughly conversant with the iron business, and would like a permanent situation in some of the Southern States. Address M. E., Dover, N. J. 45 10*

**INDUSTRIAL EXHIBITION.**—The "Maryland Institute for the Promotion of the Mechanic Arts," will hold its Fourth Annual Exhibition of American Manufactures, Machinery, &c., in the splendid new Hall, now being finished at Baltimore, from 20th Oct. to 18th Nov. next. Mechanics, manufacturers, and others are cordially invited to deposite specimens of their best productions, in competitions for the Gold and Silver Medals, Diplomas, etc. Steam power, labor, &c., is offered free to despositors. Great care will be taken that fair play shall be shown to all the exhibitors. Those desiring to deposite articles are required to notify the Committee at once, stating the nature of the goods, and the probable amount of room required to display them to advantage. Circulars containing full particulars, rules, &c., with a view of the Institute's New Hall), may be had by addressing the Agent, J. S. Selby, or the undersigned, who will promptly give any other information to those who desire it. See editorial columns of Sci. Am., of Aug. 2, 1851. ADAM DENMEAD,
46 5 Chairman Com. on Ex.

**SCRANTON & PARSHLEY,** Tool Builders, New Haven, Conn., have on hand six 12 ft. slide lathes, 28 in. swing; also four 8 ft. do., 21 in. swing, with back and screw gearing, with all the fixtures; one 5 ft. power planer; 12drill presses, 4 bolt cutting machines, 30 small slide rests; 5 back geared hand lathes, 21 in. swing; 15 do not geared; 8 do. 17 in. swing on shears 5 1-2 feet; 25 ditto with and without shears, 13 in. swing, counter shafts, all hung if wanted suitable to the lathes. Scroll chucks on hand; also index plates for gear cutting. Cuts of the above can be had by addressing as above, post-paid. 47tf

**KELLY & CO.,** New Brunswick, N. J., Foundry and Machine Shop, manufacturers of Stationary Engines, India Rubber Machinery, Mill Gearing and Stove Castings, &c. Articles made in the machinery line to order with dispatch and in the most workmanlike manner. Parties wanting machinery or castings made will be waited on within any reasonable distance. Orders solicited. 47 12*

**A. B. WILSON'S SEWING MACHINE**—We are now selling the rights for territory for this incomparable machine at low rates. We furnish to the parties the best and only practical Sewing Machine—not larger than a lady's work-box—for the trifling sum of $35. Examine for yourselves at 195 and 197 Broadway, room 23, Franklin House Buildings, N. Y. GEO. R. CHITTENDEN, Agent. 51 2*

**BOGARDUS'S CELEBRATED HORSEPOWER.**—Cranks, balance wheels, pitmans or noddle-heads, stirrups, feed hands, saw gate slides and rods, wrag wheels, carriage cogs, dogs, gudgeons, mill bars, saw gummers, and Hotchkiss wheels and shafting for saw mills; spindles, bales, drivers, hoisting screw and bales, regulating screws, mill pecks, bushes, smut machines, shafting and gearing iron water wheels for flouring mills; fly or roll bars and plates, paper cutters, Kay's callendaring apparatus for continuous sheets for paper mills; screws for lathes and presses, jack screws, wrought and cast iron shafting, pullies and hangers, heavy forging, cotton gin gear, screw-bolts and nuts, slip gudgeons are manufactured at the Speedwell Iron Works, Morris Town, N. J. Office in New York, No. 9 Gold st., with Logan, Vail & Co. P. S. Belting and bolting cloths supplied to order. GEO. VAIL & CO.
28 1amtf

**CLOCKS FOR CHURCHES, PUBLIC** Buildings, Railroad Stations, &c.—The undersigned having succeeded in counteracting, effectually, the influence of the changes of temperature upon the pendulum, and introduced a new regulator, by which great accuracy of time is produced, also the retaining power (which keeps the clock going while being wound) are prepared to furnish Clocks superior to any made in the United States. Ample opportunity will be afforded to test their performance, and those not proving satisfactory, when completed may be rejected. Astronomical Clocks made and warranted equal to any imported.

Glass (Illuminated) Dials of the most beautiful description furnished. Address
SHERRY & BYRAM,
Oakland Works, Sag Harbor, L. I.

"Mr. Byram has established his reputation as one of the first clock makers in the world"—[Scientific American.

"Mr. Byram is a rare mechanical genius"—[Journal of Com. 29 12eow*

**PALMER'S ARTIFICIAL LEGS.**—Manufactured at Springfield, Mass., and 376 Chestnut st, Philadelphia, by Messrs. Palmer & Co.—All orders from New York and New England must be made to Palmer & Co., Springfield, Mass.—"I have examined carefully the Artificial Leg, invented by Mr. B. F. Palmer; its construction is simple and its execution beautiful, and, what is most important, those who have the misfortune to require a substitute for a natural limb, and the good fortune to use it, all concur in bearing practical testimony to its superiority in comfort and utility. VALENTINE MOTT.
New York, Jan. 29, 51." 39 6meow*

**A CARD.**—The undersigned beg leave to draw the attention of architects, engineers, machinists, opticians, watchmakers, jewellers, and manufacturers of all kinds of instruments, to his new and extensive assortment of fine English (Stubs) and Swiss Files and Tools, also his imported and own manufactured Mathematical Drawing Instruments of Swiss and English style, which he offers at very reasonable prices. Orders for any kind of instruments will be promptly executed by F. A. SIBENMANN, Importer of Watchmakers' and Jewellers' Files and Tools, and manufacturer of Mathematical Instruments, 154 Fulton st. 42 3m*

**BEARDSLEE'S PATENT PLANING MA**chine, for Planing, Tonguing, and Grooving Boards and Plank.—This recently patented machine is now in successful operation at the Machine Shop and Foundry of Messrs. F. & T. Townsend, Albany, N. Y., where it can be seen. It produces work superior to any mode of planing before known. The number of plank or boards fed into it is the only limit to the amount it will plane. For rights to this machine apply to the patentee at the above-named foundry, or at his residence, No. 764 Broadway, Albany. GEO. W. BEARDSLEE. 43tf

**TO PAINTERS AND OTHERS.**—American Anatomic Drier, Electro Chemical graining colors, Electro Negative gold size, and Chemical Oil Stove Polish. The Drier, improves in quality, by age—is adapted to all kinds of paints, and also to Printers' inks and colors. The above articles are compounded upon known chemical laws, and are submitted to the public without further comment. Manufactured and sold wholesale and retail at 114 John st., New York, and Flushing, L. I., N. Y., by
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**IRON FOUNDERS MATERIALS**—viz., fine ground and Bolted Sea Coal, Charcoal, Lehigh, Soapstone, and Black Lead Facing. Iron and brass moulding Sand; Fire Clay, Fire Sand, and Kaolin; also English, Scotch, and Welsh Fire Bricks—plain, arch, circh, circular, and tower cupola, for sale by G. O. ROBERTSON, Liberty Place, between 57 and 59 Liberty st., (near the Post Office), N. Y. 41 12*

**AARON KILBORN,** No. 4 Howard street, New Haven, has on hand, and is now finishing, five 14 horse power engines; price, including boiler and all fixtures, $1200; twelve of from 12 to 6 horse-power, all of the most approved patterns, iron bed frame and pulley balance wheel. Galvanized Chain, and fixtures for chain pumps always on hand and for sale.
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**LEONARD'S MACHINERY DEPOT,** 109 Pearl st. 60 Beaver, N. Y.—The subscriber is constantly receiving, and offers for sale, a great variety of articles connected with the mechanical and manufacturing interest, viz., Machinists' Tools—engines and hand lathes, iron planing and vertical drilling machines, cutting engines, slotting machines, bolt cutters, slide rests, universal chucks, &c. Carpenters' Tools—mortising and tennoning machines, wood planing machines, &c. Steam Engines and Boilers, from 5 to 100 horse power. Mill Gearing,—wrought iron shafting, brass and iron castings made to order. Cotton and Woolen Machinery furnished from the best makers. Cotton Gins, hand and power, and power presses. Leather Banding of all widths, made in a superior manner; Manufacturers' Findings of every description. P. A. LEONARD.
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**WANTED IMMEDIATELY**—To go South, one smith, two pattern makers, and one finisher, who must not only be good workmen but possess qualifications which belong to gentlemen, they must be temperate, honest, and faithful. To such, permanent employment and good wages will be given. For particulars, address, post-paid, MUNN & CO., at is office immediately. 46, tf

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# Scientific Museum.

For the Scientific American.

### The Climate of Michigan.

A person emigrating from the east or south-east to Michigan, is surprised to find the winters much milder, and autumn later than in the same, or even a more southern latitude, near the Atlantic coast; though settled spring is also somewhat later. The author of this once resided on the banks of the Susquehanna, twenty-three miles north of Harrisburg, and during six years crossed that river repeatedly with a horse and sleigh, on the ice, every winter, during a period of six or eight weeks, and when he came to Michigan, nineteen years since, it seemed strange that scarcely any stream of water here could be crossed on the ice at any time for more than a few days.

There is also a great deal more snow in Pennsylvania than here, notwithstanding that place is at least two degrees farther south than this. Here we seldom have more than from three to five weeks sleighing in any one winter, and very frequently only two or three days; there sleighing may be generally calculated upon for nearly three months every winter; here we have very much cloudy weather, the changes are more sudden, and a hard frost of from four to seven days' standing is invariably succeeded by mild weather and a thaw; there the atmosphere is often clear, the sun appearing to shine through a thin mist, every day alike, for two or three weeks, without making any impression upon the snow even on the sunny side of a house; here we generally have repeated break-ups every winter, there one is generally the limit, and often none.

My object here is to account philosophically for the differences just stated. Let it be remembered, then, that Michigan is nearly surrounded by lakes Michigan, Huron, St. Clair, and Erie, and that there is an immense number of small deep lakes, and many marshes partially covered with water, in the interior of Michigan; and these, as well as the large lakes, radiate heat until the water in them is cooled down to the freezing point, and when a hard frost produces ice, such an immense quantity of caloric is thrown off and becomes sensible heat, (as shown in a previous article on the formation of ice), as to sensibly warm the whole atmosphere, and the heavier the frost the greater the thaw. Besides the greatquantity of water in the large lakes, which are 1600 feet deep, is scarcely ever all cooled down to the freezing point, and it therefore continues to radiate heat to the atmosphere all winter, and keeps it warmer than it would otherwise be. But in spring it requires some time to warm this large quantity of water, which makes vegetation late, except marsh grass, which generally furnishes feed early in May. There is, however, one circumstance, pretty uniform, for which I have not been able satisfactorily to account, viz., there is usually a warm spell of a week or two in the beginning of April or the latter end of March, which occasionally brings forward the buds of fruit trees to be destroyed by late frosts; but on the whole Michigan begins to furnish some excellent fruit in considerable quantities, except cherries.

It is well known that western coasts of both continents are much warmer than the eastern. For instance, in Great Britain and at the mouth of the Columbia river, the winters are as mild as they are six or eight degrees farther south on the Atlantic coast of the United States. May not this be accounted for by supposing that the prevalence of western winds brings in the heat radiated by the Atlantic and Pacific Oceans? H. R. Schetterly.

Howell, Michigan.

### Moss.

The Louisianians, have by recent chemical improvements, converted the moss which grows in the south in great profusion in the swamps, and is also found hanging in natural festoons from the trees, into an article of high commercial importance. It is more valuable than hair for upholstery purposes.—[Exchange.

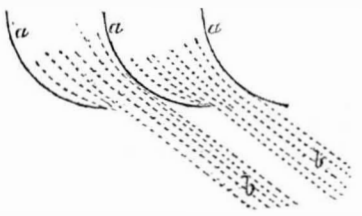
[This moss has been used in upholstering as long as we can recollect; and at the present moment is very extensively used as a substitute for hair; it is used fraudulently and in thousands of instances, by mixing it with hair, which is much higher in price. It is very inferior to hair, because it is more brittle and less elastic. Great quantities of this moss are sold in New Orleans by the Negroes who bring it from the swamps and sell it on Sundays for pocket money.

### Hydraulics.

### True Theory of the Action of Water on Re-Action Wheels.

[Concluded from page 400.]

Fig. 64.



The Best Mode of Applying the Principles Set Forth.—If water issue out at an aperture pierced through a thin plate, the discharge will only equal about ·62 of that assigned by theory; and if a tube of equal size throughout, whose length is twice that of its diameter, be applied to the aperture, the discharge will be about ·80; but if a cone-shaped tube, approaching in form the contraction of the vein be placed inside of the vessel, the discharge will be very nearly that assigned by theory.

The velocity of water is impeded by short or sudden turns in its direction. Water cannot leave a re-action wheel at a tangent, or in a line with the plane of volition; the effect will be diminished by a deviation from this line, as the cosine of the angle of deviation is to the radius. If water pass through the spaces between vanes to change its direction, the thinner and less curved those vanes are the greater the change in its direction.

In figure 67, *a a a* are the permanent vanes or chutes; *b b b* is the space between the chutes and wheel; *c c c* are the bottoms of the vanes of the wheel; *d* is a cusp of a cycloid; *d e* is a cycloid; *c f* is a tangent to the vertex of the cycloid; *d e f* is a bucket or vane of the wheel.

Fig. 65.

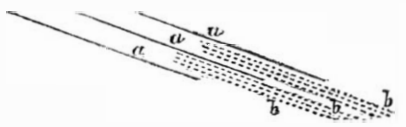
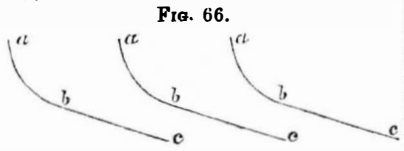


Illustration.—If water pass through the vanes, *a a a*, figure 64, its direction on leaving them will be that of the dotted lines, *b b b*; but if it pass through *a a a*, fig. 65, its direction will be that of *b b b*, a much greater change in its direction. Although the volume of water discharged will be as large, yet the quantity discharged will not be as great at fig. 65 as at fig. 64, in consequence of the contraction of the vane as above. Let the vanes be formed as in fig. 66, the top part, *a b*, cycloidal, and the bottom part, *b c*, plain, tangental to the vertex of the cycloid, and the greatest possible quantity of water with the greatest possible change of direction and velocity, will issue.

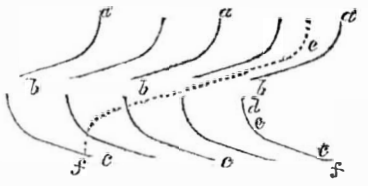
Fig. 66.



To construct a re-action water wheel in accordance with all these principles, form and situate the vanes of the chute and wheel, as in diagram fig. 67. If the water stand with its full height of head above the chutes, *a a a*, it will pass through them into the space between them and the wheel, *b b b*, and be given a direction of that of the wheel with a velocity of ·7, and will issue out between the vanes of the wheel at *c c c* in a contrary direction, with equal velocity as relates to the wheel, but, as the wheel is moving with the same velocity, without actual velocity.

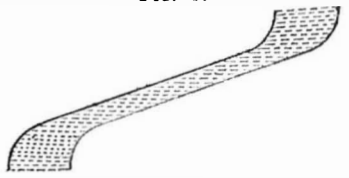
The water, in this case, will move on entering the wheel as near in the direction of the plane of its rotation as possible, and will leave it as near in an opposite one. Its velocity will be the greatest possible, and its change of direction will be such as to impede its motion as little as possible. The actual course of the water will be that of the dotted line, *a e b f*.

Fig. 67.



At *a* its motion will be very slow downwards; at *e* its motion will increase and its direction gradually change; at *b* its motion will commence decreasing and its direction changing downward; at *f* its direction will be down with a velocity only sufficient to give place to the succeeding water. The area of a horizontal section of the collection of water, and its downward velocity will not change during the whole descent from *a* to *c*. (See diagram, figure 68).

Fig. 68.



As the motion of the water is entirely arrested by the motion of the wheel, and as this is done in the most simple and least complicated manner possible—the ratio of effect to power will be as great as it is possible to obtain.

I was somewhat amused on reading the description of "Sawyer & Gwynne's Pressure Engine," in No. 43 of the Scientific American. What is it but the same principle contended for—but carried further—that is said to actuate the re-action water wheel? Where is the difference between this "new motive power" and the centrifuge of Mr. Parker? Or the centrifugal force that we are taught at school actuates the re-action water-wheel?

The term centrifugal being applied to an imaginary force which does not exist, has led many persons into error; there may be such a force as centripetal, as the attraction of the sun on the earth in its orbit; but what is called the centrifugal force is merely inertia—the indifference to motion or rest—the continued resistance of the earth to having its direction changed by the attraction of the sun, and has no relation whatever to a centre, only so far as the centripetal force tends to draw the earth to one. J. B. Conger.

Jackson, Tenn., August 1, 1851.

[We can assure Mr. Conger, that although Mr. Parker uses the term centrifuge, he does not believe there is such an independent power as centrifugal force.—Ed.]

### Electro-Magnetic Clocks.

This discovery has been patented at Berlin, by M. Siemens, Lieut. of Engineers, who has associated himself with the astronomical watch maker, M. Ziede, for that purpose. As there exist already at Berlin, electro-telegraphic wires for signalizing fires, the same apparatus will also be used for the clocks. There will be established several leading clocks in the different parts of the town, which, being connected with the wires, will indicate the time on simple dials. The cost of such a clock and wires will be twenty-eight thalers, the subsequently yearly expenses only four thalers. Such apparatus can be applied at any private house, and an additional advantage would be, that all these watches would keep an uniform and exact time.

[The above we take from an exchange, and from its phonetic lingo, it, no doubt, was originally selected from a German periodical. We have seen the same story in a great number of our exchanges. The electro-magnetic clock is not quite, a recent invention. Bain obtained the first patent for one in 1841, and we saw some of his clocks in this city, three years ago. In 1847, one of his clocks moved others 40, 50, and 60 miles distant.

A rich bed of iron ore has recently been discovered upon the land of Major Daniel Bitting, Cumru township, near Lancaster road, about 1½ miles from Reading. It has been tested at several furnaces of Reading, the Gazette says, and is found to flux with more than ordinary ease, without the admixture of other ores, and to yield a heavy per centage of pure metal of superior quality. The deposit is apparently very extensive.

### Application for Extension of Patent.

U. S. Patent Office.—On petition of Charles Porter, of Lynn, Massachusetts, administrator of the estate of E. S. Curtis, late of Boston, Massachusetts, deceased, praying for the extension of a patent granted to the said E. S Curtis for an improvement in grist-mills for seven years from the expiration of said patent, which takes place on the twenty-third day of November, 1851.

It is ordered that said petition be heard at the patent office on the second day of November next, at twelve o'clock M.; and all persons are notified to appear and show cause if any they have why said petition ought not to be granted

Persons opposing the extension are required to file in the patent office their objections specifically set forth in writing at least twenty days before the day of hearing; all testimony filed by either party to be used at the said hearing must be taken and transmitted in accordance with the rules of the office, which will be furnished on application.

Thos. Ewbank, Com. of Patents.

### Voyage Around the World.

The Swedish Government has determined to fit out the corvette Eugene, for a voyage of circumnavigation; and have invited the Royal Academy of Science at Stockholm to nominate a scientific commission to accompany the expedition. A zoologist, botanist, and physician have been appointed by the Academy.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SEVENTH VOLUME OF THE

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